

88 01669

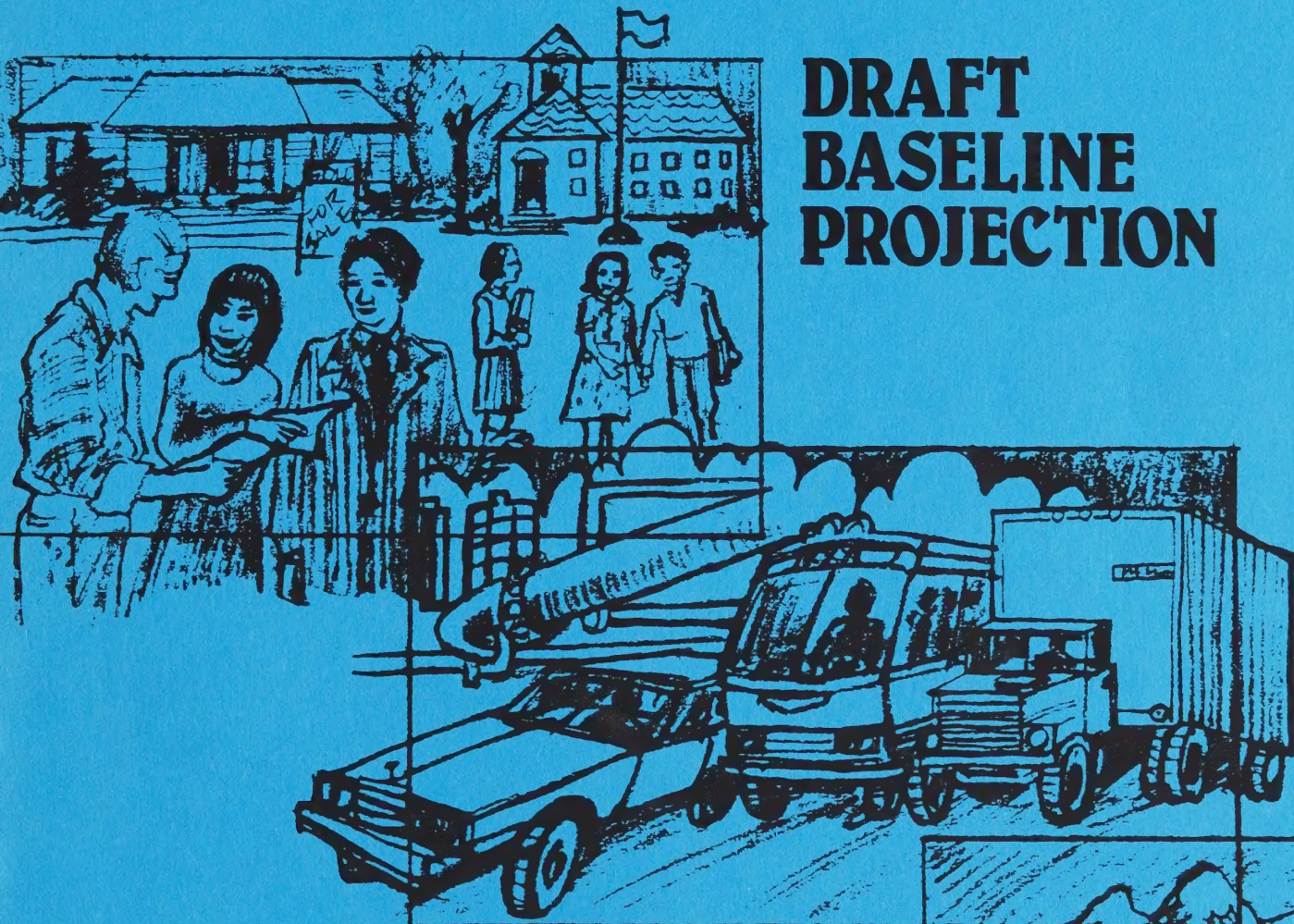
ENVIRONMENTAL
LIBRARY

NOV 16 1987

UNIVERSITY OF CALIFORNIA

IMPACT ASSESSMENT:

DRAFT BASELINE PROJECTION



Background Information for the Development of the
SCAG-88 Growth Forecast Policy

OCTOBER, 1986
UPDATED, MARCH 1987



SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS
600 South Commonwealth Avenue, Suite 1000 • Los Angeles, California 90005



88 01669

IMPACT ASSESSMENT:

DRAFT BASELINE PROJECTION

**Background Information for the Development of the
SCAG-88 Growth Forecast Policy**

OCTOBER, 1986

UPDATED, MARCH 1987

WITH CHAPTERS ON:

- Public Education
- Health Care
- Social Services
- Criminal Justice
- Transportation
- Air Quality

ENVIRONMENTAL ANALYSIS PROGRAM

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS
600 South Commonwealth Avenue, Suite 1000 • Los Angeles, California 90005

**IMPACT ASSESSMENT:
DRAFT BASELINE PROJECTION**

	<u>Page</u>
INTRODUCTION	i
 <u>PART I SOCIOECONOMIC</u>	
Special Preface to Chapters on Public Education, Health Care, Social Services, Criminal Justice	1
Economy/Employment	1-1
Housing	2-1
Public Education	3-1
Health Care Services	4-1
Social Services	5-1
Criminal Justice	6-1
Governance	7-1
Neighborhood/Community	8-1
 <u>PART II INFRASTRUCTURE</u>	
Transportation	9-1
Water Supply	10-1
Wastewater Treatment	11-1
Solid Waste	12-1
Hazardous Waste	13-1
 <u>PART III NATURAL ENVIRONMENT</u>	
Air Quality	14-1
Energy	15-1
Ecological Resources	16-1
Seismicity	17-1
Open Space	18-1
Agriculture	19-1



Digitized by the Internet Archive
in 2024 with funding from
State of California and California State Library

<https://archive.org/details/c124896981>

INTRODUCTION

This report addresses some of the potential regional impacts that could result with the realization of the Draft Baseline Projection, recently developed for the six county SCAG region, and detailed under separate cover. The Baseline Projection is an estimate of population and employment growth over the next 25 years (to year 2010), based on continuation of current demographic and economic forces in the region, and trends at the state and national levels.

The draft projection, and accompanying impact assessment provide background information for the development of a Draft SCAG-88 Growth Forecast Policy by Spring 1988. Over the next several months, local governments and SCAG's various policy and technical committees will be asked to review this information, and to develop and adopt policies for mitigating the impacts and/or intervening with the projected trends. These policies will then form the basis for Draft SCAG-88.

Significant regional growth is foreseen in the Baseline Projection, based on current and expected trends, and this growth is the subject of the impact assessment. By 2010, the population is estimated to grow to 18.3 million people from 12.4 million people in 1984--a 47% increase and about 5.9 million additional people. About two-thirds of this growth will result from natural increase of the region's population, and continued immigration will contribute to the region's growth, as well. There also will be a tremendous flow of people in and out of the region from other areas of the United States. Employment is predicted to grow from 5.9 million jobs to 9 million jobs.

The ethnic composition of the SCAG region also is likely to experience significant changes over the next 25-30 years, with the Hispanic population becoming almost as large as the NonHispanic (NH) White population. By 2010, the minority ethnic groups (Hispanic, Black and Asian/Other) are predicted to make up 59% of the population, compared to 39% in 1980. The age structure of the region is expected to change also; the Baseline Projection shows the population becoming somewhat older, with individuals 65 years and older growing by 104% (1980-2010) compared to a 58% growth of the overall population during this same period.

The amount of growth predicted for this region, as well as the magnitude of demographic change, is certain to have many impacts on the region. This report addresses some of these impacts, which are discussed according to the 19 subject areas listed below:

-
1. SCAG, Draft Baseline Projection, August 1986; Draft Baseline Projection Distribution of Population and Housing by Subregion, October 1986.
The assessment is based on the draft projection. The draft projection could undergo technical adjustments based on upcoming review by local jurisdictions that may or may not affect some of the assessment information presented in this report.

Socioeconomic

Economy/Employment
Housing
Public Education
Health Services
Social Services
Criminal Justice
Governance
Neighborhood/Community

Infrastructure

Transportation
Water Supply
Wastewater Treatment
Solid Waste
Hazardous Waste

Natural Environment

Air Quality
Energy
Ecological Resources
Seismicity
Open Space
Agriculture

Many problems already face the region today, and a scan of the above subjects suggests what many of these problems are. Although continued growth in the SCAG region offers many exciting opportunities and changes, it also presents the prospect that some existing problems may worsen, absent adequate mitigation or intervention programs. SCAG's currently adopted growth forecast, SCAG-82 Modified, forecasts a 2010 population that is 2.4 million people less than the Draft Baseline Projection. The lessons learned from previously assessing the impacts of SCAG-82 Modified were that (1) many impacts would be significant, even with the lower growth levels in that forecast; (2) greatly strengthened mitigation programs and policies would be needed to accommodate the SCAG-82 Modified growth levels, and at the same time reduce or avoid added impacts; (3) effective and adequate mitigation would be difficult to achieve for many impacts, and would be very costly; and (4) ineffective or inadequate mitigation of added impacts could actually serve to constrain a certain amount of forecast growth. These conclusions apply even more strongly to the Baseline Projection, with its higher growth levels.

After full review of the growth projection and the impact assessment, the next major step will be to examine the mitigation necessary to accommodate predicted growth levels, and/or the intervention policies necessary to reduce or redistribute these levels.

It should be noted that the impact assessment contained in this report is necessarily a generalized overview. Each and every topic could be addressed in far more depth than is accomplished here; in fact, an entire report probably could be devoted to each and every topic. The assessment also is generalized because of the difficulty in precisely determining impacts 25-30 years into the future, given the existence of so many unknowns and variables. In some subject areas, the report is only able to raise questions, issues or general implications, instead of predicting precise impacts. Much of the assessment also is at the regional level, given both the complexity and sheer geographical size of the region; however, where possible, it is at the county and subcounty levels. Despite these various limitations, the report gives a broad overview of potential impacts that need to be considered along with deliberations on the Baseline Projection, and the ultimate development of Draft SCAG-88.

The Department of the Interior has the honor to acknowledge the receipt of the report of the Commissioner of the General Land Office, and to express its appreciation of the thorough and careful manner in which the same has been prepared. The report contains a full and complete statement of the work of the Department during the year, and is a valuable contribution to the knowledge of the public mind as to the progress of the Department's work. The report also contains a full and complete statement of the work of the Department during the year, and is a valuable contribution to the knowledge of the public mind as to the progress of the Department's work.

PART I

SOCIOECONOMIC

The Department of the Interior has the honor to acknowledge the receipt of the report of the Commissioner of the General Land Office, and to express its appreciation of the thorough and careful manner in which the same has been prepared. The report contains a full and complete statement of the work of the Department during the year, and is a valuable contribution to the knowledge of the public mind as to the progress of the Department's work. The report also contains a full and complete statement of the work of the Department during the year, and is a valuable contribution to the knowledge of the public mind as to the progress of the Department's work.

**SPECIAL PREFACE TO CHAPTERS ON:
PUBLIC EDUCATION, HEALTH CARE, SOCIAL SERVICES, CRIMINAL JUSTICE**

The four subject areas of Public Education, Health Care Services, Social Services and Criminal Justice are ones that SCAG has not previously considered in its planning work as extensively as many of the other subject areas addressed in this report. Accordingly, a group of experts in these specific subject areas was invited to review and critique draft versions of the impact assessments that were initially prepared for the four subject areas. This review was accomplished in a Delphi panel meeting held in December 1986, and was followed up by written comments submitted by many of the individuals participating on the panel. The 13 participants in the meeting were as follows:

Ms. Sara Coughlin
Associate Superintendent
L.A. Unified School District

Captain Bruce Mitchell
Commanding Officer--Planning and
Research
Los Angeles Police Department

Mr. Ray Garcia
Chief of Governmental Relations
L.A. County Dept. of Public
Social Services

Dr. Eugene Mornell
Executive Director
Los Angeles Co. Human Relations
Commission

Ms. Shirley Komoto
Asian-Pacific Women's Network

Mr. Thomas Uram
Director
Orange Co. Health Care Agency

Ms. Lorraine McDonnell
RAND Corporation and Associate
Director, Center for Policy
Research in Education

Mr. Paul Rout
Deputy Director
Riverside Co. Dept. of Social
Services

Ms. Marjorie Nichols
Director of Research
United Way

Ms. Linda Wong
Associate Counsel
Mexican-American Legal Defense and
Education Fund (MALDEF)

Mr. John Mack
President
Los Angeles Urban League

Mr. Barry Nidorf
Chief Probation Officer
Los Angeles Co. Probation Dept.

Dr. Glenn Melnick
Assistant Professor
UCLA School of Public Health/
Health Services Planning

As seen from the above list, the individuals invited to review the draft assessments were drawn from both the public and private sectors, and included practitioners as well as individuals engaged in active research in one or more of the four subject areas. The panel was asked to review the

initial drafts of the four chapters as to whether they (1) addressed major issues and implications related to additional growth; (2) presented the issues accurately; (3) excluded any important information or data; and (4) presented the materials in a balanced manner.

The review of the drafts was stimulating and productive, resulting in the offering of new and different ideas, viewpoints and information. The chapters as now presented incorporate revisions based on the comments received. Staff has incorporated as many of the comments as possible, but where this was not possible, it has indicated at the end of each chapter areas where panel members believe further analysis is needed. Because the actual revisions have been made by staff, the panel is not responsible for the final content.

In general, the comments offered by the panel demonstrate that public education, health care, social services and criminal justice are exceedingly important and complex systems that ultimately require more analysis and consideration than is necessarily possible in the "broadbrush" overview offered by this report. The same goes for the 15 other subject areas addressed in the report.

The panel also found it difficult to confine itself to only reviewing the impacts of growth on these four systems; it stressed the urgency of examining policy responses to issues/problems that either exist or that might develop with additional growth. It further stressed that there are important linkages, interdependencies and cross-impacts that exist, and that need to be strengthened or minimized, as applicable, among the four systems. Unfortunately, the panel also acknowledged that some tradeoffs will have to be made by policy-makers, given conflicting and competing demands, and a limited resource base. These tradeoffs exist between and within the various systems; these trade offs also are not restricted to just these four subject areas. The current dispute over the state budget clearly points out the conflicts and difficulties inherent in this tradeoff process.

Perhaps the strongest overall comment made by the review panel was that this region must respond to the impacts of growth by viewing necessary adjustments not only as challenges, but also as opportunities to improve upon what exists today. As a final point, the panel agreed it is urgent to stress the positive possibilities which accompany the increasing demographic diversity that this region is undergoing today and in the future.

ECONOMY/EMPLOYMENT

This section recaps the employment growth and changes in economic sectors that have been projected as part of the draft Baseline Projection. It also goes one step further, analyzing four issues related to the future economy. These issues are (1) the future match between skills and jobs, (2) job/housing balance within subareas of the region, (3) the effects of economic growth on the physical and built environment, and (4) potential constraints on economic growth.

Regional Employment Growth

In 1972 there were 4.2 million jobs in the SCAG region. This number increased by more than one-third by 1984, reaching a total of 5.9 million jobs. The Baseline Projection indicates that by the year 2010 employment will reach 9 million jobs, more than half again as many jobs as existed in 1984. This is the equivalent of adding three-fourths of Los Angeles County's entire 1984 employment to the region over a 26 year period, an annual average growth rate of 2%. This is a strong growth rate, but is somewhat less robust than the recent historic rate from 1972 to 1984 (3.2%). This slowdown reflects a decline in the job formation rate at both the national and local levels, especially after the year 2000.

The Baseline Projection of employment growth is substantially higher than the numbers in the currently adopted SCAG-82 Modified forecast. A comparison of the two is presented below:

SCAG REGION EMPLOYMENT

(In Millions)	1984	2010	Absolute Change 1984-2010	Annual Ave. % Change 1984-2010
Baseline Proj.	5.9	9.0	3.1	2.0
SCAG-82M Forecast	5.9	8.4	2.5	1.6

The Baseline Projection projects 600,000 more jobs between 1984 and 2010 than does the SCAG-82M forecast, or about 23,000 additional jobs each year over the 26-year period.

County Employment Growth -- From 1980 to 1984, the largest employment growth in the region occurred in Orange County where 124,000 jobs were added out of a total 200,000 throughout the region. The fastest growth rate relative to existing employment was also in Orange County, where employment increased by about 14%. In short, Orange County had both the fastest employment growth and the largest absolute increase in employment of all the region's counties.

While Orange County captured more than half the total regional employment growth over this four year period, Los Angeles County had the second greatest absolute employment growth (39,600). It captured 20% of the region's employment growth, but except for Imperial County, had the smallest rate of growth of the region's counties.

Table 1-1 summarizes the employment growth (1984-2010) that is predicted in each county under the Baseline Projection. Los Angeles County would capture the largest share of the region's employment growth (48% or 1.4 million jobs), followed by Orange County (29%), San Bernardino (10%), Riverside (8%), Ventura (5%), and Imperial (1%). Despite Los Angeles County's capture of the largest share of employment, its percentage increase in employment would be the lowest in the region--36%. Both San Bernardino and Riverside counties would have the greatest percentage increases in employment relative to what exists today--95% and 93% increases, respectively. The increase in Orange County would be 84%.

Some significant differences exist in the distribution of employment growth when comparing the Baseline Projection with the adopted SCAG-82 Modified Forecast, as shown in Table 1-1. In the latter forecast, a significantly greater share of regional employment growth would occur in Riverside, San Bernardino and Ventura counties than in the Baseline Projection (36% vs. 23%). These counties would also capture a greater absolute amount of employment growth in SCAG-82 Modified as compared with the Baseline Projection (873,000 jobs vs. 682,000 jobs). These differences would occur despite the fact that SCAG-82 Modified would have an overall regional employment growth that is 600,000 jobs fewer than the Baseline Projection. SCAG-82 Modified also forecasts 410,000 fewer jobs in Los Angeles County and 360,000 fewer jobs in Orange County as compared to the Baseline Projection.

Economic Sector Growth

In recent years there has been a dramatic shift in the Southern California economic base, as shown in Table 1-2. The region has been undergoing a transition from a goods-producing manufacturing economy to an information-based economy. These trends are shown in the next table. In 1972, manufacturing was the largest employment sector in the region, comprising about one-fourth of total employment. Trade, services, and government sectors were the next largest employers comprising 20%, 17% and 15% of the total, respectively. Agriculture and mining were the smallest sectors.

By 1984, very rapid growth had taken place in the service sector relative to other sectors. Services and manufacturing swapped in relative order, with services taking first place and manufacturing third. Trade remained second, and government fourth. Services comprised about one-fourth of total employment, with trade, manufacturing and government ranging from 22 to 12% of the total, respectively. Services experienced both the largest numerical increase of all the sectors from 1972-1984 (583,000 jobs), and the largest percentage increase (80%). Other sectors with rapid employment

Table 1-1
COUNTY EMPLOYMENT GROWTH

	Baseline Projection				SCAG-82 Modified		
	1984 Employment	2010 Employment	Growth 1984-2010 (% of Regional Growth)	% Change	2010 Employment	Growth 1984-2010 (% of Regional Growth)	% Change
Imperial	37,000	65,000	28,000 (1%)	76%	69,100	32,100 (1%)	87%
Los Angeles	4,053,000	5,497,000	1,444,000 (48%)	36	5,084,600	1,031,600 (42%)	26
Orange	1,048,000	1,925,000	877,000 (29%)	84	1,565,300	517,300 (21%)	49
Riverside	247,000	477,000	230,000 (8%)	93	587,700	340,700 (14%)	138
San Bernardino	325,000	634,000	309,000 (10%)	95	690,000	365,000 (15%)	112
Ventura	213,000	356,000	143,000 (5%)	67	380,200	167,200 (7%)	79
Region	5,923,000	8,954,000	3,031,000 (100%)	51%	8,376,900	2,453,900 (100%)	41%

Table 1-2
 SECTORAL EMPLOYMENT--SCAG REGION, 1972-2010
 (In Thousands)

<u>SECTOR</u>	<u>1972</u>	<u>1984</u>	<u>Baseline Projection 2010</u>
Agriculture	54.9	73.9	80.6
Mining	16.1	21.6	21.6
Construction	149.5	196.8	302.0
Manufacturing	977.6	1,216.3	1,516.9
TCU	210.5	264.2	412.4
Trade	861.5	1,277.5	1,938.3
Finance, Insurance, Real Estate	218.8	353.3	552.2
Services	732.1	1,314.9	2,624.0
Government	629.0	719.8	890.8
Self Employment	<u>420.6</u>	<u>484.8</u>	<u>615.3</u>
TOTAL	4,270.6	5,923.1	8,954.1

gains were finance, insurance and real estate (FIRE), and trade with 60% and 48% increases, respectively. The manufacturing sector was relatively sluggish with a growth rate of 24%.

The trend toward a service-based economy is expected to continue between now and 2010 with the Baseline Projection, as shown in Table 2. By 2010, nearly 30% of all regional employment is projected to be in services. The absolute increase in service jobs would be substantial (1.3 million jobs), capturing over 40% of all job growth in the region. In contrast, manufacturing's share of all employment is projected to drop to 17%, making the increase in manufacturing jobs relatively small (300,000 jobs), and capturing only 10% of the region's job growth. Nonetheless, manufacturing would still remain the third largest sector of the economy. Trade would have the second largest increase in jobs after services (661,000), capturing 22% of all job growth and remaining the second largest sector. Finance, insurance and real estate would add 200,000 jobs, capturing 7% of all job growth. The fourth largest sector would remain government, growing by 171,000 jobs.

There are many interesting dynamics occurring within the broad grouping of sectors, and many of these dynamics are expected to continue in the future. In many ways the SCAG region has become a bipolar economy. There has been rapid growth in both the low skill, low wage sectors and the high skill, high wage sectors while the middle skill, middle wage sectors have experienced moderate to flat growth. Within the manufacturing sector, there has been rapid growth in low tech sectors such as apparel and furniture. Both of these subsectors have relied on the large, generally low-skilled immigrant labor force in the SCAG region. At the opposite end of the spectrum are the high tech, high skill and high wage manufacturing sectors such as computers, electrical components and medical instruments which have also experienced very rapid growth. Some middle skill manufacturing sectors such as primary metals, fabricated metals and chemicals have experienced very sluggish growth in recent years.

Similar changes are occurring with the services sector. The most rapid growth is concentrated in the areas of legal services and business services, especially computer and data processing services, while other service sectors have experienced more moderate growth rates. Today, the business and health service subsectors account for 50% of all service jobs.

During the next 25 years, high tech employment within the manufacturing sector is likely to continue its steady growth. In the low skill, low wage area, furniture is expected to continue its rapid growth while the apparel industry is forecast to reverse its trend and actually lose employment during the period. Other low skill manufacturing sectors will undergo slow or negative growth. Most of the high tech, high skill sectors within the service sector are predicted to grow at a very rapid pace, including business, computer, legal and health services.

Issues Related to the Future Economy

Four key issues are discussed here relative to the future economy. They are:

1. Will the skills of the future population match those required by future jobs, given the continued trend away from a manufacturing-based economy toward a service-based economy?
2. Will current job/housing imbalances in many parts of the region continue?
3. What effects will further economic growth in the region have on the physical and built environment?
4. What types of constraints might limit the scale of economic growth that is predicted?

Skill Levels -- In the future, a much smaller amount of employment growth is predicted in industries with high levels of low-skilled jobs, and a larger amount is predicted in industries requiring high-skilled jobs. This is not to say that there won't be an increase in low-skilled jobs nor that these jobs won't remain a significant part of the economy, but greater emphasis will exist in higher skilled jobs. The question is whether there will be an oversupply of low-skilled labor and an undersupply of high-skilled labor to match the type of job growth predicted for this region. This question is posed in view of the large supply of low-skilled labor already existing in the region, and the continued immigration predicted to occur (historically, a large percent of adult immigrants have been low-skilled).

If indeed the economy is headed toward the higher-skilled spectrum, then there likely will be an oversupply of low-skilled labor, at least in the short-term. The implications of this oversupply are increased unemployment levels, increased burdens on the social service system, and perhaps even an increase in crime and social unrest.

However, over the long-term perspective of 25 years, it is strongly believed by many analysts that several adjustments will occur (or need to occur) to bring the skill levels of the labor force into greater synchronization with the types of jobs in the economy. These changes will be brought about by: (1) job retraining of low-skilled labor for middle and high-skilled jobs; (2) redirecting the primary, secondary, and higher education systems to prepare the future labor force for higher skilled jobs; (3) the potential deterrence of immigrants coming to the region upon realizing the relative shortage of low-skilled jobs; (4) the out-migration of some low-skilled workers to locations outside the SCAG region that have greater opportunities for low-skilled labor; and (5) the attraction of high-skilled workers from other parts of the U.S. coming to the region to fill high-skilled jobs. The very high levels of gross migration predicted

to this region from other areas of the U.S. (9 million people) and from this region to other parts of the U.S. (8 million people) could very well lead to large changes in the skill make-up of the labor force.

Whether all of these dynamics will occur is uncertain. The greatest challenge will be the future training and retraining of today's low-skilled labor force, and the many changes needed in the education system and job training programs to prepare tomorrow's labor force for a changing economy. As discussed in the Public Education section of this report, the primary and secondary school system especially has not been successful in educating or motivating large segments of the minority populations. High school drop-out rates currently remain high, particularly among Blacks and Hispanics, resulting in decreased opportunities for higher skilled jobs. Those individuals that do complete high school or go on to post-secondary education have clearly made greater occupational advances.

Ultimately, if the sectors of the economy requiring higher skills cannot find a ready labor pool in the region from the resident population, or from in-migrants from other areas of the U.S., then there could well be a slowdown in predicted growth of these sectors, and a relocation of businesses out of the region. The unemployment rate could also be higher than predicted in the Baseline Projection (which predicts that the rate will drop from 7.5% in 1984 to 5.5% in 2010).

A related issue is the impact of new national immigration legislation on the regional economy. The Baseline Projection, which was developed several months ago, did not assume changes in national immigration law and accordingly, the impacts of these changes have not been analyzed. Some of the issues that need to be addressed in this region relative to the new legislation include:

- How effective would the legislation be in deterring future undocumented immigrants from coming to the region?
- How would potentially decreased future immigration of undocumented persons affect those low skill and low wage sectors of the economy that currently rely heavily on undocumented workers?
- What effects could reduced immigration of undocumented aliens have on wage rates and overall business activity? On filling of low-skilled jobs by the resident population or by in-migrants from other areas of the U.S.?
- How would the legislation affect the cost of doing business in this region vs. in other countries or other areas of the U.S.?

Job/Housing Balance -- Many areas of the SCAG region have an imbalance of jobs and housing which has created areas that are either "job rich/housing poor" or "job poor/housing rich." A key issue of concern is whether these imbalances will worsen or improve with additional growth to the region. Today, there are approximately 48 jobs for every 100 people (.48) in the region; this is the balance that currently could be hoped for in every area

of the region. Yet, as mentioned above, there are many areas that have too few residences located near places of employment, or too few jobs located near places of residence. These imbalances tend to perpetuate longer distance work commutes, and add to transportation congestion, air quality problems and energy consumption. An imbalance of jobs and housing also can make for socially or economically imbalanced communities.

Table 1-3 shows the relative job/housing balance in each county today. As seen from the table, Los Angeles and Orange counties have a ratio of jobs to population that is comparable to the regional average (.48), with ratios of .52 and .51, respectively. However, Riverside, San Bernardino, Ventura and Imperial counties have less-balanced ratios of .30, .29, .35, and .36, meaning there is a lack of jobs relative to housing in these counties. This situation is caused, in part, by the concentration of jobs in Los Angeles and Orange counties, along with the high cost of housing in these counties, making it necessary for many employees to live in outlying counties where housing is more affordable. Ideally, this situation could be improved by policies and incentives encouraging more new jobs in the outlying counties.

Table 1-3
JOB-TO-POPULATION RATIOS IN SCAG REGION

	1984	2010	
		<u>Baseline</u>	<u>SCAG-82M</u>
Imperial	.36	.39	.45
Los Angeles	.52	.57	.58
Orange	.51	.62	.55
Riverside	.33	.24	.42
San Bernardino	.32	.27	.38
Ventura	.37	.35	.41
Region	.48	.49	.53

The table also shows the projected ratio of jobs to population in each county for 2010 under the Baseline Projection. For comparative purposes, the ratios for the adopted SCAG-82 Modified Forecast are also provided. Note that under both projections the 2010 regional ratio is higher than today, meaning that the region's employment growth will occur more rapidly than population growth over the 26-year period. This is partly attributable to higher predicted labor force participation rates (i.e., proportionately more of the population will hold jobs in the future).

Under the Baseline Projection, trends show that job/housing imbalances that currently exist in Riverside, San Bernardino and Ventura counties (too few jobs relative to population) would continue and actually worsen by 2010. This would occur despite significant employment growth in these counties; the problem occurs because there would not be sufficient employment growth relative to population growth, thus resulting in a growing shortage of jobs. Los Angeles and Orange counties, which are currently relatively

balanced in terms of jobs and population, would move toward having ratios even higher than the regional average (.57 and .62 vs. .49), meaning there would be a growing shortage of housing relative to population.

In contrast, existing job/housing imbalances would improve in the SCAG-82 Modified Forecast, especially in Riverside, San Bernardino and Imperial counties. The reasons for these improvements are distributional policies incorporated into the SCAG-82 Modified Forecast which encourage greater employment growth in the counties that are currently "job poor/housing rich."

Effects of Economic Growth on the Physical and Built Environment -- When people ponder the impacts of growth on the environment, they often think of population growth and residential growth. Yet, a very large component is economic growth, and the tremendous number of physical structures and support facilities that must be built to accommodate this type of growth.

The addition of 3.1 million new jobs to the economy over the next 25 years is certain to continue the commercial/industrial building boom evident in the region today. The high to moderate rates of growth predicted in the services, finance/insurance/real estate, and government sectors (55% of all new jobs) will proliferate demand for continued building of high-rise and mid-rise office buildings. Similarly, the high rate of growth in trade (retail/wholesale) will continue the building of low-rise and mid-rise establishments. Even the slowed growth in the manufacturing sector will necessitate moderate growth of the more traditional low-rise, land-intensive factories and warehouses.

The counties of the region that are expected to capture the largest shares of the region's employment growth (Los Angeles and Orange counties) are the ones that will experience the greatest amount of building construction. But these counties already have large employment bases, such that new economic activity will be mainly additive to what already exists. The other four counties will not capture as much of the region's overall employment growth and building activity, but what they do capture will be very large relative to what exists in these counties today. In other words, the most dramatic physical changes in the urban landscape of commercial/industrial buildings will be in these outlying counties; in Los Angeles and Orange counties the changes will be more intensified building in already intensely built environments, with the exception of relatively undeveloped areas in these counties that will undergo very significant growth (i.e., Lancaster/-Palmdale area, etc.).

The questions and issues that are emerging today relative to commercial/industrial development should grow in importance over the next 25 years, not only in the highly urbanized areas but also in urbanizing areas. These questions and issues relate to desired or acceptable building densities, heights and overall scales, architectural style and aesthetic issues, and the "fit" of commercial buildings in or nearby residential neighborhoods.

Along with residential development, commercial and industrial development will cause other changes in the physical and built environments, as discussed under separate subject areas of this report:

- A significant amount of vacant land will be converted for commercial and industrial development, particularly in the outlying counties where raw land is available. In the highly urbanized areas, where raw land is relatively scarce, new economic activity will be accommodated primarily through recycling and densification.
- Increased demands will be placed on local infrastructure facilities (water, sewer, etc.).
- Traffic congestion will increase in and around economic activity locations, and along work commute travel paths, necessitating truly innovative solutions (new facilities, increased transit, etc.).
- Additional air emissions will be generated, and additional nonrenewable energy resources will be consumed.

Mitigating actions will be extremely important to either prevent, reduce or modify all of these impacts.

Potential Constraints to Economic Growth -- The general assumptions built into the Baseline Projection acknowledge that "while serious problems are anticipated in providing the new infrastructure and resources that would be needed to accommodate the projected population [and economic activity], the projection was not constrained due to the assumption of infrastructure or resource limitations." Particular reference is being made to transportation facilities, water supply and other infrastructure. Similarly, the projection assumes that poor air quality will not be a deterrent to regional growth.

In essence, the projection assumes that potential obstacles to growth (i.e., infrastructure and resource limitations) can be worked out with appropriate mitigating actions. Nonetheless, it should be acknowledged that some of these obstacles may be unsolvable, in which case, economic (and population) growth may in fact be constrained below predicted levels, either naturally or through direct policy actions. The inability to accommodate greatly increased traffic may be the single biggest obstacle to growth. (Some people contend that various limitations or problems in this region will not constrain predicted growth levels, because of the greater desirability by many to live in this region as compared to other regions or other countries.)

Mention should also be made of increasingly strict enforcement and tougher environmental regulations in the areas of air, hazardous waste, and water quality. These regulations may make it very expensive for some industries to do business in Southern California, and may act as a damper on some economic growth. Energy availability is another factor that could affect long-term economic growth.

HOUSING

Regional Housing Growth

The Baseline Projection shows a regional growth of 2.8 million dwelling units between 1984 and the year 2010. This represents a 61% growth of dwelling units over the current stock, or an average of 109,000 additional units per year. This is a large increase over current growth rates (of 72,000 units per year). The new forecast exceeds the previous forecast (SCAG-82M) by 960,000 dwelling units over the 26-year period.

A growth rate this high raises questions as to the industry's capacity to accommodate consumer demands adequately. In particular, potential issues of inadequate local infrastructure and inadequately zoned, developable land may result in additional local political pressures for growth controls, and may in fact create impediments to housing growth which will lower the predicted regional totals.

On the positive side, the housing industry in the past two years (1984-1985) has sustained levels of growth (106,000 units per year) similar to those projected without material shortages, shortages of skilled trades, shortages of developable land and the intrusion of large-scale price speculation reminiscent of the late 1970s. However, many of the determinants of growth and supply were in dormancy during the recession of 1980-82, and a certain amount of "slack" capacity has carried over into the current "boom." It is questionable whether these levels of housing growth can continue for the next 25 years without increasing demands for growth moratoria, added infrastructure costs and additional land speculation.

It is important to note an assumption which is integral to this forecast: that national monetary policy and interest rates would be a "neutral" force on future regional housing growth.

County Housing Growth -- Future housing growth would be more evenly spread among four counties (Los Angeles, Orange, San Bernardino, Riverside counties) than in the past (which was dominated by Los Angeles County). Los Angeles County, while still the largest county producer of housing and the largest county, would drop its share of all dwelling units from 62% to 52% of the total in 2010. Its share of all housing growth would be 33%, while Riverside and San Bernardino counties combine for 42% of all the growth. This is a marked shift from their current share of the regional total of 16%. Orange County's share of the growth would be 17%, and Ventura's would be 7%. The highest rates of housing growth would occur in Riverside and San Bernardino counties, with housing growing by 181% and 144%, respectively. (See Table 2-1)

Subregional Housing Growth -- The primary residential growth areas would be in the "urbanizing" subregions. They are generally the lower cost land and housing areas compared to the rest of the region. Of the 10 largest growing areas listed below, 5 are classified as "urbanizing" and 2 are classified as mountain/desert:

Table 2-1

TOTAL DWELLING UNITS--
BASELINE PROJECTION

<u>County</u>	<u>1984</u>	<u>2010</u>	<u>Growth (1984-2000)</u>	<u>% of Regional Total-2010</u>	<u>% Share of Regional Growth</u>
Imperial	33,400	60,600	27,200 (81%)	1%	1%
Los Angeles	2,924,900	3,865,300	940,400 (32%)	52	33
Orange	760,000	1,253,400	493,400 (65%)	17	17
Riverside	327,000	919,200	592,200 (181%)	12	21
San Bernardino	408,600	995,800	587,200 (144%)	13	21
Ventura	196,500	385,300	188,800 (61%)	5	7
Region	4,650,400	7,479,600	2,829,200 (61%)	100%	100%

<u>Ten Largest Growing (Housing) Subregions</u>	<u>1984-2010 D.U. Growth</u>	<u>1984-2010 % Growth</u>
* Southeast Orange County	353,000	139
* Chino Basin	246,000	183
* Central Riverside	214,000	237
* Riverside/Corona	197,000	151
E. San Gabriel Valley	179,000	77
● Riverside Desert	174,000	172
* E. San Bernardino Valley	146,000	100
Northwest Orange	141,000	28
● San Bernardino Desert	139,000	163
Glendale/Pasadena	138,000	31

* urbanizing subregion
 ● mountain/desert subregion

The above 10 areas represent 68% of all the housing growth forecasted for the 23 subregional areas within Southern California. Generally, the growth areas are in the eastern portion of the region. (The exceptions, Glendale/Pasadena and northwest Orange County.) In 7 of the 10 cases, the growth rates are exceptionally high, and could likely put local infrastructure systems to severe tests.

Growth of this magnitude also tends to encourage the development of "super-developments" and satellite cities similar to Irvine and Mission Viejo (5 to 20,000 dwelling units).

Affordability of Housing

Clearly, Southern California is a very desirable place to live, for many U.S. residents. The availability of vacant developable land in relationship to demand, is crucial to the issue of housing affordability. Stated conversely, the lack of an adequate supply of land in relationship to the demand can be directly attributable to the price differential between Southern California housing prices and the remainder of the U.S. This differential serves as a "drag" on local housing demand from other regions. It also severely reduces the mobility of housing consumers within the region who cannot afford to compete at higher price levels. If the same inflationary factors reappear in the region as those of the 1976-1979 period, when demand overwhelmed the region's capacity to supply housing (and prices rose 20-25% per year), we can expect another slowdown in interregional growth, as housing costs would dampen demand and affect the local economic base.

Impacts of Housing Construction on the Environment

The addition of 2.8 million dwelling units to this region will utilize an estimated additional 647,000 acres of urban land for growth, at 4.37 units to the urban acre. The significant amount of additional units is nearly equivalent to 86% of all the dwelling units currently in Los Angeles County. It would mean the addition and "filling" up of the major outlying

valleys within the region. It would also mean increasing densities in the already "built-out" areas of the region. This magnitude of growth will impact regional and local infrastructure systems, particularly transportation, and will require additional water and sewer capacity. These topics are covered in other sections of this report.

Urban design and aesthetics considerations also are likely to be very much affected by the great amount of housing stock added to the region. Issues related to style and design compatibility are likely to continue with respect to infill housing and new housing developments.

Housing Densities

The projected density of 4.37 dwelling units to the urban acre for new housing compares with the current density of 3.59 dwelling units to the urban acre. This 22% increase in density is based on total urban acres. If data were available, densities at the "residential acre level" could also be measured. The gradual increase of densities on the regional scale to 3.85 units per urban acre, would still allow the region to retain its "low density" character compared to other "world" cities. However, in more narrowly defined geographic areas like Central Los Angeles County, densities would rise to 7.30 dwelling units to the urban acre from a current level of 6.73. Within this "average" density, the range of densities may be 1 d.u./acre to 100 or more units in high-rise construction. In highly urbanized subregions, 86% of all new housing is projected to be multifamily, compared to the current 48%. And in urbanizing subregions, 44% of new housing would be multifamily, compared with the current 31%.

Household Size

The following table shows the recent, long term and projected trends in household size for the region. An examination of the data reveals a fairly long term downward trend for the region, and for the different ethnic groups which comprise the population. (An exception would be short run increases in household sizes during periods of housing supply slumps.) The implications of future declining household size are discussed in the next two subsections.

Household Projections

In order to forecast total dwelling units, household growth must be forecasted first. The difference between total households and dwelling units is unoccupied dwelling units. Hence, occupied dwelling units equals households.

Using the Baseline Projection, which is an unconstrained forecast for future population growth in the region, and applying household headship rates to each future age cohort, total future households can be estimated for each ethnic group. Total household growth accelerates appreciably from the previous forecast, SCAG-82. Whereas the previous forecast estimated an annual growth rate of 77,000 households per year, this revision, to the

year 2010, increases the annual rate to about 94,000 per year. This is due to several factors. The most important is an increase in the year 2010 population from 15.94 million to 18.25 million. Additionally, by using a new method for forecasting households, we decrease the persons per house-hold average size from 2.72 (1980) to 2.63 (in 2010). This decrease (in household size) by itself, increases the average yearly household growth by 8,900 households or by 9.0% over household growth due to population growth alone.

Ethnic Influences on Household Size and Amount of Housing Needed

The projected 2010 regional average household size (2.63) is based on the changing ethnic mix in the region. Whereas NH Whites comprise 62%, and Hispanics comprise 23% of the 1980 population, by 2010 those percentages are projected to be 41% and 39% respectively. This is important as the current average NH White household size is 2.40 persons per household while Hispanics average 3.86 persons per household. In 2010, those averages are predicted to be 2.21 for NH Whites and 3.26 for Hispanics, as shown in Table 2-2. What this implies is the following:

1. That average household size for all ethnic groups will decrease.
2. That those ethnic groups with the largest average household sizes are becoming a larger percentage of the region's ethnic mix, tending to reduce the decrease in household sizes for the region. In other words, if we kept the same ethnic mix in 2010 as presently, household size would drop further to 2.46 (vs. 2.63) or an additional 19%. This difference would create the need for an additional 485,000 units over the 1980-2010 period or an additional 18,650 units per year.
3. How much will future housing demand be affected by these changes in ethnicity and household size?
 - a. The population growth of the region will account for 91% of household growth.
 - b. Decreasing household sizes will account for the remaining 9% of household growth.
3. In addition, the changing ethnic mix of the region constrains, or suppresses household growth by 19%.

Effects of Changing Age Structure on Housing Demand

The Baseline Projection includes a projection of the age distribution of the 2010 population. This distribution reveals the stage of the household "life cycle" where much of the future population will fall. There are basically three household consumption stages: They are, by age of household head:

Table 2-2

PERSONS PER HOUSEHOLD -- SCAG REGION
BY ETHNIC GROUP

Ethnic Group	Year			2010 SCAG Baseline**	1960- 2010 /\
	<u>1960*</u>	<u>1970*</u>	<u>1980*</u>		
NH White	2.93	2.69	2.40	2.21	-.72
Black	3.33	3.14	2.80	2.52	-.81
Asian/Other	N/A	3.56	3.26	2.80	-.76
Hispanic	3.98.	3.81	3.86	3.26	-.73
Total	2.99	2.93	2.72	2.63	-.36
U.S. Totals	3.33	3.14	2.76	2.56	-.77

* U.S. Census

** SCAG projections

1. 15 to 34 years -- "Household Formation" Stage
2. 35 to 64 years -- "Household Move-up" Stage
3. 65+ years -- "Empty Nester and Dependent" Stage.

Based on how much of the population will increase within each stage, the following observations can be made:

1. Overall, total households will increase by 68% over the forecast period.
2. Of the three age groups mentioned above, the age group 65 and above will grow 102%, the Move-up stage will grow 91%, and the New Household Formation group will grow by 14%.
3. Demand for new forms of "elderly" housing will be very strong. While in the past, many of the elderly have depended on "paid-up" mortgages on single-family homes to supply their housing needs, their increased lifespan will create a whole new market. This market will need to offer a whole spectrum of services to housing which will meet the various dependency needs of especially those in the 75 and above age group. The range of needs could include simple "granny flats" behind the traditional single family home, accessory units within the home, elderly rentals in congregate settings with full social and health care services available, and full-care nursing homes, etc.
4. Demand for larger family homes, or those homes with amenities for those moving up (traditionally homeowners) will continue to increase, and raise prices for these homes. A major unanswered policy issue involves two housing demand determinants that seem opposed: The large forecasted gain in Hispanic/Asian/Black households, which cumulatively have a low homeownership rate, and the large forecasted gain in households in the 35-64 age group, which traditionally have high ownership rates. What remains unclear is whether the unequal distribution of incomes between NonHispanic Whites and other ethnic groups will persist over time or change to accommodate the increasing demand for homeownership.
5. The relatively slow growth of the age group in the New Household Formation stage, despite large population increases, indicates a real slow-down in demand for additional rental units, especially apartments. This age group is usually most dependent on the rental market, as new households usually have the smallest incomes and stored equity to purchase housing.
6. The demand of an "ethnically diverse" housing market will continue to grow as over 53% of all housing consumers will be Hispanic, Black or Asian by 2010. More importantly, 95% of all additional households will be in these ethnic groups.
7. All of these projections assume the relative affordability of future housing prices and the continued presence of lower income

households in the market who cannot afford the average market priced single-family home.

Fair Share Housing Issues

This topic relates to a more equitable share of low and moderate income housing opportunities among the jurisdictions within the region. While it is difficult to project the spatial distribution of housing 25 years hence, several patterns have already emerged. Los Angeles County has the highest priced land within the region and produces some of its most expensive housing. Concurrently, it also has the largest share of low income and government subsidized housing within the region (see Inventory of Subsidized Housing, by SCAG). This juxtaposition of rich and poor also has racial and ethnic undertones; Los Angeles County has the largest share of NonHispanic Whites as well as minority groups within the region. In the Immigration Report (SCAG 1985), several trends were highlighted of interest there: that 83% of all immigrants were settling in Los Angeles County and that 80% of all immigrants were Hispanic or Asian. Should these trends continue, further concentration of minorities will probably occur in this county. 75% of all immigrants were minority and low income, further exacerbating the spatial concentration of lower income households within the region. What these trends imply, given the fair share goals in the region, is a much greater need to provide housing opportunities for ethnic minority and lower income households in other areas of the region outside of Los Angeles County.

Additionally, in the previous Regional Housing Allocation Model (RHAM) a regional need of 800,000 low and moderate income units was measured in 1983 and an additional need for 200,000 units was forecast for the following five years. With the drastic cutback in federal housing programs, and the large influx of new dwelling units being forecasted, our ability to meet these future needs is severely in question.

Homelessness Within the Region

The SCAG region currently has more homeless persons than any other region within the nation (see HUD's Report on Homelessness, 1984). Our climate, high housing prices, deinstitutionalization policies towards the mentally ill, and unemployment rates have all contributed to our current total of 30-50,000 homeless people. This figure has been disputed by housing advocacy groups as grossly understating the true need, but a lack of documentation exists for any published figure. Although subregional data on the location of the homeless is sketchy at best, there seems to be general agreement that they tend to congregate in central cities and beach communities. It appears that homelessness is not a function of growth, as many nongrowth areas of the country have also experienced a rise in homelessness in the past five years. However, if the root causes of homelessness are institutional in nature, rather than a short term cyclical effect of the recent recession, then we can expect to see increasing numbers of homeless people in our region as the region grows and expands.

Currently, local governments, the state, and federal governments, supplement private volunteer efforts to treat the problem. They are not meeting the need, and currently there do not appear to be any alternative answers to meet this need on the horizon.²

2. Also, see SCAG's report on "Homelessness in the SCAG Region," for the SCAG Regional Advisory Council, January, 1986.

PUBLIC EDUCATION

Increased Demand for Teachers and School Facilities

The dramatic population growth in the Baseline Projection has very significant implications for public education needs (e.g., additional schools and teachers) in the SCAG region over the next 30 years. Based on the age-cohort projections in the Baseline Forecast, regional school-age population (ages 5-17 years old) would increase as follows:

<u>School-Age Population (5-17 Years Old)</u>	
1980	2,359,820
2000	3,164,003
2010	3,226,620

The school-age population would grow by about 870,000 children, or 37% during 1980-2010. This compares with about a 60% increase in total population during this period. Although school-age population is growing at a very significant rate, it will grow at a slower rate than the overall population because of the general shift to an "older" population structure by 2010. Another significant trend is that school-age population will grow at a much faster rate during the period 1980-2000, than during the 2000-2010 period, reflecting a slowdown in overall population growth and the noted growing shift toward an older age structure. Accordingly, the most significant impacts on education will occur during the 1980-2000 period.

This growth in school-age children is meaningful in terms of the need for additional public schools (K-12) and teachers. Rough estimates of these needs were made for the region in the years 2000 and 2010, based on assumptions relating to factors such as current percent of school-age children actually enrolled in schools (94%), current percent of students in public vs. private schools (87%), new schools being required for 90% of additional public school enrollment, average school sizes (800 students per elementary or junior high school, and 1900 students per senior high school), and average existing teacher to student ratios based on both regular and special classrooms (1:23). Note that the estimate of needed teachers is based on additional students and does not include replacement of teachers that will retire over the 30 year time frame.

The estimates show the following need for public schools and teachers. Note that needs drop off significantly during the 2000-2010 period due to the growth rate slowdown mentioned above. In fact, there would not be a need for additional senior high schools during 2000-2010 due to the halt in growth of senior high school age students.

Public School Needs in the SCAG Region

	Elementary and Junior High Schools	Senior High Schools	Teachers
1980-2000	+521	+95	+28,900
1980-2010	+582	+95	+31,100

Clearly, these figures represent very large needs over the next 30 years, and they also imply increased needs up through the community college, state college, and university levels.

Probably the single biggest issue is how additional schools are to be financed, given the tremendous fiscal constraints currently facing public schools in California. Many of these constraints were caused by Proposition 13 when it passed in 1979, and have not been overcome despite the infusion of increased state funding over the past few years. Because of the fiscal squeeze, there is already a shortage of schools in many areas of the region where rapid growth has occurred (e.g., the central areas due to high levels of immigration, and outlying areas due to rapid urbanization), resulting in overcrowding of many schools. For example, the L.A. Unified School District currently has approximately 120 overcrowded schools, out of a total of 618 schools, and is operating 93 year-round schools (mostly in the Southeast and Central City areas) as well as busing over 35,000 students from overcrowded schools to schools with surplus space. An additional 80 schools are being considered for year-round programs.

Recent estimates place the cost of new schools in Los Angeles at \$10-12 million for an elementary school, \$30 million for a junior high school, and \$60 million for a senior high school. State Supt. of Public Instruction Bill Honig estimates a need for \$1 billion a year for the next 10 years to build enough classrooms statewide and to maintain those already built. The Los Angeles Unified School District alone estimates a need for \$1 billion over the next five years to build classrooms and enlarge existing campuses. Innovative financing mechanisms will be needed to meet school facility needs over the next 25-30 years.

A related issue will be where to locate new schools which are needed; in highly urbanized areas, there is likely to be a critical shortage of land for constructing new schools. In contrast, areas undergoing relatively slower growth may actually experience a surplus of school space. This overall situation could require continued transfer of students from overcrowded schools to undercrowded ones. The surplus of school space in some areas also offers the opportunity for converting this space to other needed uses.

In addition to new school facilities, another major challenge will be attracting sufficient numbers of people into the teaching field to meet the growing student enrollment. The teaching profession has become less attractive over recent years, and the challenge will be in continuing to find better methods for recruiting, retaining and retraining teachers. It

will be important to find more highly qualified and experienced teachers who can assist in improving educational quality as well as teachers who have a diversity of backgrounds, awareness and skills to teach the diverse and growing student population.

The significant increase in student population projected for the next twenty-five years presents major challenges for state and local policy-makers. For example, the demand for new teachers will not be met unless teaching is viewed as a more attractive profession. Yet initiatives to make teaching more attractive, such as reducing classroom sizes or increasing salaries, must compete for scarce resources with other priorities such as building additional school facilities. Making such trade-offs will no doubt constitute a major challenge. At the same time, meeting the needs of a growing student population may also present welcome opportunities. For example, the RAND Corporation notes that there is a growing consensus among policymakers and educators that high schools could be more effective in educating students if they were smaller than the typical ones of today. The need to build additional facilities provides an opportunity to vary both the size and organization of schools, and thus help improve the quality of education that students receive.

Serving the Needs of a Diverse Student Population

Along with the growth in school-age population will be increasing ethnic and cultural diversity. In 1980 about half of all children were NonHispanic White and the remainder Hispanic, Asian/Other or Black. By 2010 NonHispanic White children will be 30% of the school-age population, declining by 20% from today's levels. Hispanic children will more than double, Asian/Other children will nearly double, and Black children will increase by nearly 1-1/2 times. Hispanics will comprise the largest single segment of school-age population in the region (51%). Projected changes in the ethnic mix of school-age children are shown below.

Table 3-1

SCHOOL-AGE CHILDREN (5-17 YEARS)

Ethnicity	1980	2000	2010
NH White	1,189,241 (50%)	1,092,915 (35%)	948,506 (29%)
Hispanic	757,064 (32%)	1,448,514 (46%)	1,643,051 (51%)
Black	258,232 (11%)	363,398 (11%)	355,597 (11%)
Asian/Other	155,283 (7%)	259,176 (8%)	279,467 (9%)
TOTAL	2,359,820 (100%)	3,164,003 (100%)	3,226,620 (100%)

Recent efforts at improving the quality of public education need to be sustained and strengthened as student enrollment grows and becomes more diverse. Since the 1960s, there has been a marked decline in the academic performance of all students in grades K-12. California's school system particularly has had problems educating its growing minority student population; it has worked better for middle class students, but has succeeded less well for lower income and disadvantaged youth, among whom Black and Hispanic youth are overrepresented. For example, Black and Hispanic youth in general have scored substantially lower on scholastic achievement tests. Additionally, a smaller percentage have completed high school; statewide, 68% of Blacks and 64% of Hispanics have reached 12th grade, compared with 86% of NonHispanic Whites and 90% of Asians. (Southern California Research Council, Financing Quality Education in Southern California, 1985.)

Factors in the educational system that have been attributed to the above differences include: language barriers to learning among immigrant youth, "tracking" of minority youth in nonacademic programs, overcrowded classrooms in minority schools, ineffectual teaching programs, inadequate counseling/tutorial programs, inexperienced teachers, and lower per pupil spending in minority schools (United Way Service Profile #402). Today, California also has the largest classroom sizes of any state, and is still below the national average in per pupil expenditures (ranks 31st among all states), despite recent funding increases. (Policy Analysis for California Education--PACE, Conditions of Education in California 1986-87, October 1986.)

Improving the quality of education has become a major statewide policy issue during the last four years, in response to falling student

performance (by all students), enrollment drops and the fiscal pressures of Prop. 13 that has contributed to erosion in the quality and substance of California schools. An educational reform movement was begun statewide in 1983; it has entailed increased state funding, and has been directed toward improved teaching and strengthening of the basic core curriculum, as well as high school graduation requirements.

This reform movement has resulted in clear signs of improvement in student performance: achievement test scores are up in most grades for reading, writing and math for all students, and although the high school dropout rate continues to be high, it also appears to be improving (PACE, Conditions of Education in California, 1986-1987). The PACE report has concluded that authentic gains in educational proficiency are taking place, because test scores are rising at a time when the proportion of disadvantaged minority students is increasing, and presenting a greater rather than lesser challenge to the school system. The most common interpretation of the upward trend in student performance is that in those areas where money and attention have been focused, performance has improved.³

Improving California's educational system requires substantial resources. Educators believe educational excellence can be produced, but it requires consistent provision of adequate resources, directed toward improved curricula and classroom conditions, upgrading of the teaching profession, and also continuation/expansion of special programs designed for the growing disadvantaged student population. Not only must efforts continue to improve educational quality, but enrollment growth must be accommodated and funded. The up-and-down pattern of school funding during the past 10 years is viewed by many educators as a hindrance to long term system improvements. While policy-makers have treated public education relatively well during the past four fiscal years, educators are greatly concerned about waning fiscal support, and the possibility that recent gains may be slowed or reversed. There is a recognition that politically it may be difficult for education to get increasing allocations from limited state resources, especially given other competing statewide issues (PACE, Conditions of Education in California 1986-87).

Linkages Between Education and the Economy

Both the education and business communities view continued educational improvements as vital to preparing today's and tomorrow's youth for a changing economy, and for restoring the nation's competitiveness in national and international markets. These preparations must begin at the primary and secondary levels where basic skills are learned. Unless these improvements can be made for all students, and particularly the growing disadvantaged minority population, it is believed there will not only be large economic costs, but large social costs as well (e.g., a less skilled

-
3. A recent RAND study also concludes, based on recent trends, that educational achievement will improve among succeeding generations of Hispanic immigrants as they become more acculturated into American society. RAND, Current and Future Effects of Mexican Immigration in California, 1985.

workforce, lower productivity, increased welfare costs and potentially more crime (Southern California Research Council on Financing Quality Education, 1985).

As discussed in the Economy/Employment chapter of this report, the region is moving from a manufacturing-based economy to a service-based economy. A greater number of jobs in the future will require people with high levels of worker knowledge, on-the-job analysis and problem solving, a broader degree of creativity, independent thought and action, and disciplinary knowledge, all of which require substantial education and training. To properly educate tomorrow's labor force, PACE states that "the emerging economy seems to need adaptable people, prepared for a working life of continual learning, problem solving and communicating . . . which reinforces the need to continue improvements in the nation's and California's educational systems."

In a similar fashion, postsecondary education is critical to the creation of a well-trained workforce. The California Postsecondary Education Commission currently is reviewing the Master Plan for Higher Education with respect to the proper missions for each of the three public segments of higher education (community colleges, state colleges and universities). The Commission also is reviewing educational quality and educational equity issues at the postsecondary level, and ways to bolster college-going rates of Hispanic and Black minorities which are far below those of NonHispanic Whites and Asians.

Vocational training is an area that still needs attention. Despite the trend toward a higher-skilled economy, there will still be a large need for lower-skilled and mid-skilled jobs. According to the above-referenced PACE report, vocational programs in high schools are facing increased competition for funding from academic programs; Enrollment in these programs is down, as is funding for vocational education. This applies to the community colleges, as well. More vocational opportunities and options are needed in the high schools and community colleges for students who are not college-bound nor tracked for higher skilled jobs.

Impacts of Continued Immigration on Public Education

Continued high levels of immigration to the region also will have impacts on public education, especially in terms of continued needs for special language programs. In 1980, the SCAG region had about 155,000 immigrant school-age children who had been in the U.S. five years or less, representing about 6.5% of all school-age children. Most of them were not fluent in English. In addition to these children were the American-born children of recent immigrants, many of whom also cannot speak English, especially at the younger ages. A recent report by Policy Analysis for California Education, based at UC Berkeley and Stanford University, estimates that 23% of 5-17 year olds in California speak a language other than English at home.

Increased immigration of the last decade has had profound impacts on public education requiring special language programs and instructors. Over 80

different languages or dialects are represented in the L.A. Unified School District alone, and while there has been relative success in providing teachers with Spanish language background, there is a shortage of teachers with background in many of the other languages.

The Baseline Projection foresees levels of immigration over the next 30 years that are similar to the recent past, although at a declining rate from 1990 onward. By 2000, it is estimated there will be about 130,000 immigrant school-age children who will have been in the U.S. five years or less. By 2010, the amount will be 115,000 children. During the course of the 30-year period, an estimated 800,000 immigrant children will be going through the school systems. This large amount of immigrant children will require continuation of existing language programs at about the same levels or slightly lower than today. A major controversy in the California school system today is the direction that these programs should take--whether they should be bilingual (i.e., teaching foreign students general curricula in their native tongue while providing instruction in English proficiency) or total immersion (i.e., teaching foreign students entirely in English). Proposition 63, which establishes English as the "official" language could affect current state regulations governing bilingual legislation that are scheduled to expire 6/30/87.⁴

As a concluding remark, it is important to note that compared with today, a much smaller percent of the Hispanic and Asian children in the schools in 2010 will be immigrants. Most will be first, second and third generation U.S. born. Considerable cultural and lingual assimilation will have occurred among these children. However, the relatively smaller immigrant group will probably continue to exert a noticeable influence on the school system as it assimilates into the mainstream culture.

Issues Needing Further Consideration

- A more sophisticated projection of regional teacher needs over the next 30 years is needed which takes into account factors such as attrition and size of the teacher reserve pool. The estimates given in the chapter only consider teachers needed for additional enrollment, and underestimate total teacher needs.
- The following issues need further consideration and/or policy development with respect to the projected increase in school-age population: the role of schools as substitute or supplemental

4. The Delphi panel reviewing this chapter points out that it is important to view education of adult immigrants as part of the formal educational system, rather than as a social service (as discussed in Chapter 5). In addition to learning English, many adult immigrants in the 25-35 age group have 40 or more years to go in the labor force, and they need more basic education and skills/job training via adult programs provided in the school system and various vocational programs. A related issue is the need of English-speaking adults (and children) to learn foreign languages that will allow them to compete better in an international economy as well as a multicultural region.

parents; the role of schools in providing childcare for a growing workforce of women; parental involvement in education; the problems of teenage pregnancy and adolescent parents; teenage suicide; and juvenile crime and substance abuse. (It is noted that the U.S. has the highest adolescent birthrate of any industrialized nation. Most pregnant teenagers do not complete school, and many ultimately go on welfare. Many experts believe the schools can play a stronger role in assuring that pregnant teenagers complete their education and escape poverty or the welfare roles.)

- More discussion is needed on opportunities for closer linkages between schools and other public or private institutions that are geared toward children's services (i.e., juvenile justice, child protective services, health, social welfare). More consideration should be given to the potentially increased role of schools in coordinating fragmented juvenile social services, and in playing an increased role in counseling, drug abuse and crime prevention.
- More discussion is needed on the impacts of growth and change on the postsecondary education system, and current problems being experienced (i.e., budgetary problems; the small percentage of minority high school graduates who go on to college; the decline in community college opportunities for disadvantaged or minority students).
- Closer examination is needed to look at impacts on the economy that could result if the educational system is unable to provide sufficient educational and training opportunities to young people for filling more and more skilled job needs in the economy.
- Policies need to be developed for getting more financial support to the schools from the community-at-large.

HEALTH CARE SERVICES

The Baseline Projection reveals a significant trend in the SCAG area's population for the year 2010: the population will move to an older age structure. The maturation of the "Baby Boom" generation as well as greater longevity help explain the aging trend in the population. This trend has very important implications for the provision of health services, as does the predicted overall growth of the general population by nearly 6 million people between now and 2010. Other demographic changes likewise will influence the region's health care delivery system.

Health care in the SCAG region is provided by a complex network of health care facilities, offering a wide variety of services for all ages and income groups. The health care system includes public and private facilities and encompasses: general acute care hospitals, acute psychiatric hospitals, chemical dependency recovery hospitals, skilled nursing facilities, intermediate care facilities, community clinics and private physician care. All types of service are available ranging from surgery, intensive care and rehabilitation to skilled nursing, intermediate care and perinatal care (medical care during pregnancy and six months after birth). These services are available to residents through various program types: direct payment for service by recipients as well as health insurance reimbursements offered by private insurance companies, and programs such as Medicare, the national health insurance program available to people 65 years and older, and MediCal, the state/federal program of medical assistance for the needy.

The quality of health care programs and their ability to meet specific needs of the growing population will be a major concern for planners and administrators. Health care costs are another significant issue. Costs to both users and providers have increased dramatically despite efforts by public and private sectors to maintain reasonable rates. Concentrated efforts must be made to keep health care affordable and accessible for all sectors of the population. Also, there is a relative imbalance in demand for specific health care services. Skilled nursing facilities are operating at very high levels of occupancy while some general acute care hospitals are facing possible closure, due to low occupancy rates. These latter facilities may serve as an important resource to meet the needs of growth in the overall population by 2010. Additional health care professionals, such as physicians, and skilled nurses will undoubtedly be required as the population grows. In Los Angeles County alone, there is an estimated 20% shortage of nurses in hospitals (United Way Service Profile #204).

Impacts of An Aging Population on Health Care Delivery

Aside from the large growth of the region's overall population, the growth of the "mature" population will probably present the most challenges and demands to the health care system. First, it is important to note that the age group 65 years and older is projected to grow by 104% from 1980 to 2010. The absolute growth will be from 1.1 million people to 2.3 million

people. Within this age group, the 85 year and older population grows most rapidly at a rate of 340% from 1980 to 2010. (See Table 4-1) The overall population growth rate for this time period, by comparison, is 58%. Based on these growth rates, consideration must be given to the unique and specific needs of the "mature" population and any changes in and/or expansion of existing facilities needed to meet health care demands. As a group, the elderly use health care services at three times the rate of the general population, due to their higher incidence of acute, chronic and disabling diseases. They require relatively high rates of physician care, hospitalization and long-term nursing or custodial care, particularly the age group 75 and over.

Traditional health care facilities for the elderly who need continuous and extended medical care are skilled nursing facilities (SNF). These facilities are commonly called "convalescent" or "extended care" facilities. The facilities provide 24-hour nursing care and rehabilitation to patients who are extremely ill, but who no longer require hospitalization. Individuals commonly use these facilities until they are well enough to return home. Medicare pays full or partial coverage for the first 100 days of usage. In the SCAG region there are 540 skilled nursing facilities, providing a total of 54,061 licensed skilled nursing beds. Some general acute care hospitals also have licensed skilled nursing beds on their premises. In Los Angeles County, for example, 15 skilled nursing facilities out of a total of 381 are located in general acute care hospitals. (See Table 4-2)

Currently skilled nursing facilities are operating at an occupancy rate of approximately 92-94%, depending on the facility. This is an alarmingly high rate of occupancy, especially when considered in conjunction with the high growth rate (154%) projected for the age group 75 years and over. This group is most likely to utilize these types of facilities. Using the present ratio of 47 skilled nursing beds per 1,000 people 65 years and older, the health care system could need approximately 51,000 more SNF or ICF beds by the year 2010, making an almost 100% increase in inventory. Typically, there are 93 beds per facility, thus indicating a potential need, in 2010, for at least 500 additional skilled nursing facilities in the SCAG area. This represents a very significant need. By only 1990, the state has estimated that this region will need 10,000 additional skilled nursing beds (Office of Statewide Health Planning and Development, 1985 California Statewide Health Facilities and Services Plan).

In addition to skilled nursing facilities, many elderly, especially those 75 years and older, rely heavily on nursing homes offering custodial care on a permanent basis (help in walking, getting in and out of bed, eating, dressing, bathing and taking medicine). It is anticipated that the significant growth of the elderly population over the next 25 years will place a growing demand on these types of facilities, as well. A major problem is the high cost of custodial nursing homes to the elderly. Typically, they can cost up to \$2,000-3,000 per month, and the costs are not covered by Medicare or most private health insurance programs. As a result, most costs for nursing home care are borne out-of-pocket by the elderly, with the exception of the indigent elderly for whom MediCal

Table 4-1

POPULATION PROJECTION FOR AGE GROUP 65 YEARS AND OLDER
1980-2010

	<u>1980</u>	<u>2000</u>	<u>2010</u>	<u>1980-2010</u>
65-74	690,179	927,437	1,179,938	71%
75-84	349,133	674,546	693,062	99%
85+	104,530	315,075	459,778	340%
75+	453,663	989,621	1,152,840	154%
65+ (TOTAL)	1,143,842	1,917,058	2,332,778	104%

Source: SCAG Baseline Projection.

Table 4-2

LICENSED HEALTH CARE FACILITIES
SCAG REGION, 1986

<u>Counties</u>	<u>General Acute</u>	<u>Skilled Nursing</u>	<u>Interm. Care</u>	<u>Home Health</u>	<u>Adult Day Care</u>	<u>Community Clinic</u>	<u>Free Clinic</u>
Imperial	3	3	0	1	0	4	1
Los Angeles	144	381	7	120	8	118	11
Orange	39	63	1	33	2	25	2
Riverside	14	36	1	18	1	8	1
San Bernardino	18	41	3	20	0	12	0
Ventura	12	16	1	8	0	7	1
<hr/>							
Total	230	540	13	200	11	154	16

Source: State Department of Health Services, May 1986.

usually provides financial assistance. Many elderly who pay for nursing home care end up going through their life savings, and then must turn to MediCal for financial assistance.

Over the last few years, increased attention has been given to alternatives to nursing homes for the elderly. These alternatives focus on home health care. They are potentially less costly and ultimately more beneficial for the elderly population needing long-term custodial care. For the elderly who are physically frail and continuously dependent on skilled nursing, institutional care such as nursing homes and skilled nursing facilities certainly will continue to play a major health care role. However, there is a very large portion of individuals who require long-term health care or custodial assistance which could be provided outside the institutional setting. It is this population that should be able to increasingly utilize home health care alternatives to institutional care.

Emerging services include: homemaker assistance, adult day care centers, home health care and friendly visiting. These programs offer services such as companionship, ambulatory assistance, meal preparation and dietary assistance, physical therapy, and home-health aide and visiting nurse services. Individual counties presently fund some of these programs as do a number of private nonprofit entities such as United Way. Presently, 200 home health care agencies exist in the SCAG region. Approximately 75% of all visits are paid to clients 65 years and older. There are also 11 licensed adult day health care centers in the SCAG area, each of which serves between 20 and 30 individuals although with increased funding, these centers could ultimately be utilized by 5% of the "mature" population. (United Way Service Profiles #205, 704, 705, 780, 785.) Homemaker assistance programs also report that over 75% of all clients are over 65 years old.

The ultimate value of these programs is that they prevent premature institutionalization of elderly people who require health care, but who are physically independent or semi-independent, allowing them to remain in their own homes, in familiar settings and with some sense of independence. In addition, this system of health care for the elderly is less costly than institutionalization. Only those services required are used, the need for construction of new nursing homes is reduced, and volunteer services are utilized for some services such as friendly visiting and homemaker assistance.

Major financial barriers do exist, nonetheless. There is currently a shortage of skilled nurses, upon whom these types of programs rely on very heavily. In addition, many of these programs have limited funding, and they cannot offer competitive wages to their employees. Finally, many of these alternative care services are not covered or minimally covered by private insurance companies, and Medicare and MediCal provide only limited coverage for most of these services. Thus, many elderly persons are forced either to incur "out-of-pocket" expenses or to refrain from these programs altogether. The problem is particularly difficult for the elderly poor; in Los Angeles County alone, 9% of the population 65 and above lives below the poverty level (United Way Service Profile #204).

Another emerging health care alternative for the elderly is "lifecare" communities. Similar to retirement communities, they provide individual apartments for residents, as well as health care facilities and specialists on the premises. Typically, meals are provided in a dining room commons, and maid service is provided. If needed, a community nursing facility is also available. For some elderly, these communities offer an attractive alternative to hanging on at home as long as possible, and retreating, if necessary, to a nursing home. Much of what can make advanced age so difficult--isolation, vulnerability to accidents and fear of institutionalization--seems comfortably distant. The concept of an age-segregated community is also attractive to many who desire companionship with their own age group. Today, an estimated 1,100 retirement communities nationwide provide at least some nursing services and personal care, and lifecare communities are a rapidly growing industry (Los Angeles Times, August 5, 1986). Unfortunately, lifecare communities remain an option largely for the well-to-do. (Also see Housing section.)

Clearly the significant growth of the mature population over the next 25 years warrants considerable attention in terms of meeting its potential health care needs. Evaluation of various alternatives must consider the various costs involved in building new facilities, and training skilled nurses, support staff and so on. Yet, these monetary costs alone should not determine the measures to be implemented. Quality of life measures for the mature population are also a primary concern. Planners and administrators should consider the alternative health care programs mentioned above, both in terms of their relative costs and the benefits that the elderly population might derive. Additionally, it appears that changes will need to be made to Medicare, MediCal and supplemental private health insurance programs to provide expanded coverage for the health care needs of the aging population. Limited coverage is certainly a problem for the elderly poor, and can quickly become a problem for elderly people who are not poor, especially when long term or catastrophic illness strikes.

Impacts of Other Demographic Changes on Health Care

Implications for the health care system are not limited solely to those presented by the increasing elderly population. The growth of the overall population by over 5 million people will exert increased demands on all existing health care services in the region. There will be an increased need for health care professionals, and an increased need for additional health care facilities. Health care planning will need to determine those additional services/facilities that are needed, and also the appropriate distribution of manpower and services throughout the region so that all population is adequately served and has accessible health care.

Prenatal, postnatal and pediatric health care are particular services that are certain to experience increased demand/need. The needs will be the greatest for minority populations whose fertility rates are projected to remain higher than the NH White population in 2010, as shown in Table 4-3. Of total births projected during 2005-2010, 72% are projected to be by ethnic minorities compared to 59% during the period 1980-1985, as shown in

Table 4-3

TOTAL FERTILITY, BASE POPULATION¹

	<u>NH White</u>	<u>Black</u>	<u>Asian/Other</u>	<u>Hispanic</u>
1980	1.46	2.23	1.99	3.03
2000	1.66	2.28	1.92	2.76
2010	1.70	2.22	1.90	2.63

¹ Total fertility = births per female of child-bearing age. Base population excludes recent immigrants and in-migrants from other areas of U.S.

Source: SCAG Baseline Projection, 1986.

Table 4-4

PROJECTED ANNUAL AVERAGE BIRTHS

	<u>NH White</u>	<u>Black</u>	<u>Asian/Other</u>	<u>Hispanic</u>	<u>All</u>
1980-1985	91,709	25,270	15,036	89,576	221,591
2005-2010	75,476	29,953	21,833	141,863	269,125

Source: SCAG Baseline Projection, 1986.

Table 4-4. The number of annual Hispanic births is expected to nearly double by 2010. Health care services will need to emphasize programs that promote health care for both mother and child during pregnancy as well as after birth, because studies have shown that a larger proportion of expectant minority mothers (Black and Hispanic), because of income, do not receive obstetrical attention until they have completed their first and sometimes second trimester of pregnancy. (United Way Service Profile #204.) This care is very important in order to prevent later complications. The cost of treating childhood defects due to lack of prenatal care is many times greater than that of providing the prenatal care. Infant mortality rates also remain very high among the Black population in Los Angeles County (18.8 deaths per 1000 live births). This compares with 12.3 for NH Whites, 7.8 for Hispanics, and 5.1 for Asians.

The continued entry of immigrants to this region will also continue to pose unique challenges for the health care delivery system. Though annual immigration is expected to decrease, the immigrant population will continue to be a significant segment of the population. Over 3.3 million immigrants are predicted to come to this region over the next 30 years. Of particular importance is preventive health care (general check-ups, prenatal, well-baby and dental care, etc.) and public health care (immunizations, and infectious disease control). Because many immigrants come from countries with different health standards than the U.S., it is important that they receive thorough check-ups and any necessary medical treatment during the initial phases of their residence here.

Mental health centers may also experience a rise in clientele due to the immigrant population. Some of the immigrants are political refugees who may need counseling because of traumas they have experienced in their native countries. Other immigrants may be experiencing cultural shock or alienation due to a drastic change in lifestyle, loss of traditional support groups and so on. To be truly helpful, mental health services will need to be more sensitive to cultural backgrounds of immigrants. Many immigrants avoid mental health care because the cultural approach is different, language often is a barrier, mental illness is not as openly publicized in some cultures, and some cultures have more tolerance for aberrant behavior. Community-based centers with bilingual and bicultural staff will probably be the most effective approach to treating mental illness among many immigrants.

Emergency room facilities may also see a rise in clientele since, because of the high cost of health care services, many immigrants (and low income population in general) postpone medical treatment until there is no alternative but emergency care. Likewise, many do not have regular physicians and turn to emergency facilities when they need medical care. It will be the responsibility of health care officials to ensure that these service centers are easily accessible for those who need them; additional fiscal costs to government incurred in providing preventive health services may indeed be less than those associated with treatment during more advanced stages of illness.

Bilingual and bicultural staff will also be necessary to insure better health care for immigrant sectors of the population. It will make them feel more comfortable about medical visits; they will become better informed as to proper health care procedures; and they will be able to communicate more effectively with health care staff. It could also make providers more successful in their treatments. Furthermore, sensitivity to particular cultural differences and special needs of individuals of different ethnic backgrounds and legal status needs to be better incorporated into all aspects of health care planning and preparation.

On the subject of undocumented immigrants, it should be noted that they currently are not eligible for MediCal (although their U.S. born children are eligible). The counties and some private hospitals do provide health care assistance to undocumented immigrants; however, several studies demonstrate that undocumented immigrants use health care services at rates much lower than legal immigrants out of fear of detection. This is unfortunate, because they are usually in greater need of health services due to poorer housing, poorer sanitation, etc. When they do use services at public hospitals and clinics they often pay in cash out of personal funds to eliminate potential questions about immigration status (The Politics of Migrant Health Care; Ruben Rumbaut, Leo Chavez et al, San Diego St. University and UCSD, 1986). The newly-enacted national immigration law could ultimately reduce county health care costs associated with low-income undocumented immigrants, since it would allow those who have been in the U.S. since prior to 1982 to become legalized by 1988, and to then utilize the State's MediCal program five years later--1993--assuming their income is still low enough at that time to meet eligibility requirements.

Finally, greater attention needs to be given to the health care needs of the poor and low income population of the region. This population has great difficulty meeting the costs of needed health care, and must rely on free or low cost health care provided by MediCal and/or county programs. In Los Angeles County alone, nearly 14% of the population (almost 1 million persons) lives at the poverty level, and about 70% of this population are ethnic minorities (United Way Service Profile #204). If the same percent of the region's population remains poor under higher population levels, then the absolute number of people requiring assisted care will increase. Poverty levels will hopefully improve in the future, but currently and in the near future, increased health care needs of the poor need to be anticipated and addressed by public and private providers/facilities.

Meeting the costs of health care is not only a problem for the region's very poor, but also for the "working poor" who often do not receive health insurance as part of their employment, and cannot afford private insurance. An estimated 20% of the population in California is not covered by any type of health insurance--private or public (United Way Service Profile #204). There also are many people who are underinsured, most notably those elderly who cannot afford the supplemental private insurance usually needed to augment Medicare and who are not poor enough to qualify for MediCal.

Today, provision of health care to the poor is facing many problems that need to be solved. Many facilities are overburdened and many patients cannot get needed care. The number of private physicians who will take MediCal patients is dropping because of the shift toward fixed price rather than actual cost reimbursement. This trend, in turn, puts added burdens on already overcrowded public facilities. At the same time, both MediCal and the county health programs are increasingly faced with the need to cutback on their own costs in providing assisted health care. The net result of these problems is that many poor are forced to forego necessary health care (including routine or preventive care). This ends up exacting much larger social costs in the long term. Clearly, solutions are needed for today and the future.

Emerging Trends in Health Care

Finally, there are some overall trends within the health care system that should be considered along with general population growth within the region. Occupancy rates for facilities other than skilled nursing facilities and intermediate care facilities are quite low in some areas of the region--between 52% and 60%. Hospitals and clinics in selected areas of the SCAG region may face closure because of a lack in clientele. The effects of Medicare's new Diagnosis Related Group (DRG) plan are also reflected in these low occupancy rates. The DRG plan specifies a fixed reimbursement payment for each type of illness. This type of payment plan restricts the length of inpatient stays for various illnesses; potential drawbacks arise if patients are sent home prematurely; also, restrictions on hospital stays can expand in-home skilled nursing needs. The DRG plan also encourages outpatient treatment in lieu of in-patient treatment for many illnesses. Outpatient treatment may increasingly become the predominant trend if rising health care costs and reductions in Medicare coverage combine to make inpatient care unaffordable.

Also on the topic of Medicare, it should be pointed out that this program is providing less and less medical coverage for persons 65+ above, making it necessary for many to seek supplementary private insurance programs. On a national basis, Medicare pays for only about 50% of medical costs for the elderly population. The most affected group are the low income elderly who do not meet the eligibility requirements for MediCal supplements and at the same time cannot afford supplemental private insurance. Studies have shown that this group underutilizes necessary medical care.

As discussed previously, Medicare and MediCal provide limited coverage for "extended" health care costs; this applies to extended hospital stays, to skilled nursing facility care, to nursing home care, and to home health care. Private insurance is not always affordable or available to supplement these costs. As a result, extended health care costs can indeed become catastrophic for the elderly. As the growing elderly population lives longer and is faced with chronic or terminal illnesses, it seems necessary that expanded insurance coverage will need to be made available. Congress currently is considering expanded Medicare coverage for lengthy hospital stays, but as of yet, provisions for expanded coverage of nursing home care or home health care are not being as seriously considered.

Another emerging health care trend is that acute care facilities are receiving considerable competition from Health Maintenance Organizations (HMOs) in serving the overall population. The HMOs offer a wide range of medical services for a prepaid membership fee. HMOs reduce medical costs by requiring a single fee rather than payment for each individual service. They are also thought by many to provide more comprehensive health care on a continuous basis. In light of increasing health care costs, a proliferation of HMOs may be a reality in 2010.

Mention should be made of the mentally ill homeless, a group that is growing in the SCAG region. If this group grows along with overall population growth, more effective mental illness programs will be needed to assist this group. Finally, the health care system needs to be flexible enough to respond effectively to new or growing diseases/epidemics that place increased demands on the health care system (AIDS, Alzheimer's Disease, etc.).

It is evident that the current health care system is going through major systematic changes, and will need to continue doing so in light of the large population growth projected for the region, and other demographic changes as well. The changes projected for 2010 will demand innovative thinking on the part of administrators and legislators, as well as a departure from traditional types of institutional health care, to insure accessible, affordable and effective health care for all SCAG region residents.

Issues Needing Further Consideration

- The health care system must become more responsive to not only the special needs of an aging population, but also to an increased diversity of culture and language among its patient base.
- Health services need to consider the increased need for planned parenthood classes and parenting classes for the teenage population. Pre- and post-natal care must also be better emphasized for pregnant teens.
- The Delphi Panel reviewing this chapter stresses the need for a greater partnership between the private and public sectors in the delivery of health care services.
- Life extension issues are expected to become more prominent in the future, particularly in terms of availability to all segments of the population. Will organ replacements, dialysis, etc. be available to only those who can afford it?

SOCIAL SERVICES

Social services are an important function that the SCAG region delivers to its residents. There is a great diversity of people in this region, and a great diversity of social service needs. A key issue relating to the Baseline Growth Projection will be the extent and nature of increased demand for social service programs. This section examines some of the various public and private social service programs and the implications of projected population growth and demographic changes on these programs.

A major category of social services are the public assistance programs that provide income support or financial assistance to the poor. These include major state and federally sponsored programs such as Aid to Families with Dependent Children (AFDC), Food Stamps, the SSI/SSP program for aged, blinded and disabled, and the MediCal health assistance program. Counties also provide relief and assistance to the needy in various forms, including General Relief which is available to certain indigents not eligible for federal and state assistance programs; they also help administer state and federal programs such as AFDC and Food Stamps.

But social service programs go well beyond these public assistance (welfare) programs. They embody a wide variety of other programs that respond to other societal needs, as well. These types of programs include:

- Family and Personal Support Programs (e.g., counseling services, drug rehabilitation, youth and recreation programs, adoption services, in-home support services for the elderly, adult day-care, childcare, handicapped services, emergency food and shelter services, legal aid, hospice programs, translation/cultural transition programs for new immigrants, and community center programs).
- Intervention and Prevention Programs (e.g., suicide prevention, rape response and respite programs).
- Protective Services (e.g., child abuse and protection, foster care, adult protective services).

Some of the services mentioned above are provided by governmental programs, but many are provided by the region's private social service organizations (many of which are nonprofit). Cutbacks over recent years in several public/governmental programs have resulted in an increasing share of services being provided by the private sector. As a result, private social service programs have grown considerably. Hundreds of organizations throughout the region raise and spend money to supply the variety of services mentioned above. Some organizations sponsor privately funded programs that correspond to public programs; some organizations also deliver services for publicly funded programs under contract or purchase of service agreements.

United Way has traditionally and symbolically represented many nonprofit social service and health service organizations, having some 350 members and affiliates, many of them the largest and best-known agencies. But hundreds of other organizations exist apart from United Way, some of them quite small and localized. Religious organizations offer a variety of service programs similar to those available from other private services; the Catholic Charities and the Jewish Federation Council, in particular, have very large social service programs. Most private sector programs are oriented to specific population groups: the poor, the homeless, the young, the elderly, families, different ethnic groups, and members of different religions.

Impacts of Population Growth on Major Public Assistance Programs

This section focuses on potential impacts of growth on demand for selected public assistance programs: AFDC, Food Stamps and MediCal. These programs are selected because they are very large governmental programs, and they entail large governmental expenditures. Following this section is a discussion of other public/private social service programs that may undergo increased demand from the large amount of regional growth projected for the future.

First, some definitions and background information are in order. The AFDC and Food Stamp programs are funded through a combination of federal, state and county cost sharing formulas. AFDC payments are made primarily to needy family groups with children and are used as supplemental income; AFDC is also available to unemployed heads-of-households and to participants in foster care programs. The Food Stamp program basically operates on a voucher system where eligible participants use special stamps, instead of direct payment, for the purchase of food items. Finally, the California-sponsored health program, MediCal, a derivative of the federal Medicaid program, is available to qualifying low income individuals. Individuals or families receiving AFDC cash assistance, as well as aged, blinded and disabled persons receiving SSI/SSP (Supplemental Security Income/State Supplementary Program), are automatically eligible for MediCal coverage. All three of the above programs are available to qualifying U.S. citizens, legal immigrants, and refugees. Undocumented immigrants generally are not eligible for any of these programs, although their U.S. born children are eligible if they meet qualifying requirements.

Some very limited projections have been made of increased demands on these three programs resulting from the level of growth contained in the Baseline Projection. These projections are based on current usage rates of today's population, and simply applied to future population levels. Obviously, this technique of estimating demand is very unsophisticated, but it does provide limited insight into possible changes in demand for these three programs.

In reality, demand for social services will not necessarily grow in direct proportion to overall population growth. Many important factors will affect demand, particularly the socioeconomic characteristics of tomorrow's population (income levels, unemployment rates, education levels, age

structure, etc.). Since many of these factors are unknown, it is very difficult to make reasonably accurate predictions, but some of these factors are discussed following the general estimates below.

Demands on AFDC Program -- In the operation of the AFDC program, the region's average monthly number of recipients in 1986 was 807,000 persons (70% children), representing 6.4% of the region's population. Recipients received approximately \$147 million in payments per month (Table 5-1). Totaled over a year, the expenditures are \$1.8 billion. Average monthly payments to individuals are \$183. As can be seen from the annual expenditure figures, AFDC is a very large welfare program. The allocation of costs for assistance payments is 50% federal, 44.6% state, and 5.4% local. Administrative costs are approximately 10% of assistance payments and are provided on a cost-sharing formula that is 50% federal, 25% state and 25% local.

Although it is a gross approximation, if we assume that the same percentage of future population required AFDC assistance (6.4%), then approximately 1.2 million people will receive AFDC payments in 2010, at a monthly cost of \$214 million in current dollars, and an annual cost of \$2.6 billion. (The costs could be lower since children aged 0-18 years, the primary recipients of AFDC, will make up a smaller portion of the 2010 population.)

Demands on Food Stamp Program -- Using the same necessarily simplistic techniques, similar figures can be estimated for the Food Stamp Program. Today, approximately 738,000 people utilize food stamps in the SCAG region; these benefits are valued at nearly \$26 million per month (Table 5-2). Approximately 5.8% of the region's population uses this program. Using the current per capita usage rate and expenditures, estimated monthly expenditures in 2010 could be \$38 million per month in current dollars, with payments being made to over 1 million individuals. The coupons themselves are 100% federal; administrative costs are shared on a basis of 50% federal, 25% state and 25% local.

Demands on MediCal Program -- During FY 85/86, there were 1.2 million persons enrolled in this program (9.6% of the region's population), and payments totaled \$2.1 billion for the year, meaning the average payment per enrollee was about \$1700. If the same proportion of future population were to use the MediCal program, there would be approximately 1.8 million persons enrolled by 2010, with yearly payments totaling \$3 billion in current dollars (Table 5-3). The MediCal program is federal and state funded, but public hospitals and clinics are contractually obligated to treat MediCal patients, and must pick up those costs that are not fully reimbursed by MediCal. (The counties also provide assistance to medically indigent adults (MIAs) who do not qualify for MediCal, i.e., indigent adults who are not on AFDC, Food Stamps, or SSI/SSP. Some undocumented immigrants receive assistance from the counties for health care; the Los Angeles County CAO estimates these assistance costs were \$115 million during FY 84/85. However, several studies indicate that many undocumented immigrants actually underutilize needed health care services out of fear of detection or deportation, and often pay for services out-of-pocket when they do utilize services.)

Table 5-1

AFDC RECIPIENTS AND PAYMENTS
SCAG REGION
April, 1986

Family Group Recipients	674,064
Family Group Expenditures	\$127,210,000
Unemployed Recipients	132,897
Unemployed Expenditures	\$ 20,279,000
Total Recipients, April 1986	806,961
Total Expenditures, April 1986	\$147,489,000
<hr/>	
Estimated Total Monthly Recipients, 2010 ¹	1,170,900
Estimated Total Monthly Expenditures, 2010 ²	\$214,275,000

¹ Based on usage rate of existing population (6.4%) applied to 2010 population.

² Calculated based on overall average payment of \$182.77 derived from 1986 total recipients/1986 total expenditures.

Source: AFDC/Family Group/Unemployed Statewide Cashing Grant Case load Movement and Expenditure Report, April 1986; Department of Social Services, State of California.

Table 5-2

FOOD STAMPS ALLOCATIONS
SCAG REGION
April 1986

Total Persons, April 1986	737,798
Total Value of Coupons, April 1986	\$25,831,000
Average Monthly Per Capita Payment, 1986	\$35.01
<hr/>	
Estimated Total Persons, 2010 ¹	1,077,187
Estimated Total Monthly Value of Coupons, 2010 ²	\$37,712,000

¹ Derived by applying percentage of current recipients/total population (5.8%) to 2010 population.

² Estimated total persons, 2010 x average per capita payment in 1986.

Source: Participation and Coupon Issuance Report, April 1986, Department of Social Services, State of California.

Table 5-3

MEDI-CAL RECIPIENTS AND PAYMENTS
SCAG REGION
FY 85/86

FY 85/86 Persons Eligible/Enrolled (Average monthly)	1,204,256
FY 85-86 Persons Using (Average monthly)	640,365
FY 85/86 Payments	\$2.087 billion

Estimated 2010 Persons Eligible/Enrolled ¹	1,752,672
Estimated 2010 Payments ²	\$3.04 billion

¹ Based on 9.6% of population eligible/enrolled during FY 85/86 applied to 2010 population.

² Based on average payment of \$1733 per enrollee.

Source: Mr. William Maxfield, California Department of Health Services.

As mentioned above, it is very difficult to accurately predict increased demands that will be placed on these three programs. The technique used above--one that assumes that demand will increase at a rate proportional to population growth--is an extremely oversimplified technique. Numerous factors will affect future demand for welfare and assistance programs. The primary factor will be the socioeconomic characteristics of tomorrow's population (income levels, unemployment levels, labor force participation rates, educational attainment, family structure, age structure, etc.).

The increasing ethnic diversity of the region's population is a trend that requires some attention. This trend could pose additional challenges to social welfare programs. Analysis of available data from the State indicates that use of government-funded programs such as AFDC, Food Stamps, and MediCal is not dominated by any one particular ethnic group, although certain ethnic groups (Blacks and Hispanics) utilize these programs at higher rates than their share of the region's population would suggest. The higher usage among these two groups is largely attributed to lower income levels. As noted in the Health Services section, 23% of Blacks and 21% of Hispanics were at the poverty level in Los Angeles County in 1980. The figures for NH Whites and Asian/Others are 7% and 13%, respectively. Factors other than income which may be associated with higher usage rates are family structure, fertility rates, unemployment rates, education, and historical patterns of societal neglect.

One question is whether there will be a disproportionate increase in demand for public assistance programs accompanying the predicted high growth rates of particular ethnic groups who today use these programs at a higher-than-average rate. This should not be the case if socioeconomic levels of these groups can improve over time. Improvement will depend partly upon the opportunity structure, including the region's ability to strengthen many institutions and programs that may better enable individuals to advance themselves.

It is important to note that many fundamental changes are now being considered (or enacted) for welfare assistance programs at the local, state and federal levels. These changes are meant to encourage self-sufficiency and economic independence among existing welfare recipients, and also to help break the cycle of welfare dependency that often passes on to children of welfare recipients. The hope is that these changes will turn welfare programs into short-term, as opposed to long-term, support programs. Welfare reforms being considered at the federal level include various incentives for recipients to return to school, enroll in training programs or look for jobs. Social service experts believe that major welfare reforms incorporating some or all of these features will be enacted at the national level over the next few years. Congress and various groups and organizations are currently studying welfare overhaul.

In California, legislation has passed creating the GAIN (Greater Avenues of Independence) program. This program is designed to move welfare recipients into the workforce, and includes counseling assessments, job training, remedial education, and employment incentives. The GAIN program will be administered at the local county level, and eventually will absorb the WIN

(Work Incentive) Demonstration Program which currently offers services and opportunities to AFDC recipients to assist them with job training and employment.

It is hoped and anticipated that these reform programs will lower existing and future welfare utilization rates.

The recently signed national immigration reform bill also has some implications for welfare assistance (and public health) programs. The amnesty provisions allow undocumented immigrants who have been in the U.S. since prior to 1982 to become eligible for state and federal programs such as AFDC, Food Stamps and MediCal for which they are currently ineligible. The earliest that eligibility would be available to most undocumented who become legalized would be 1992/1993. As with other legal residents, they could only use the programs if they meet program eligibility requirements. Until eligible for state and federal programs, the bill provides that needy undocumented can use county General Relief programs for which they are currently ineligible. The immigration bill authorizes \$1 billion per year in federal assistance over a four-year period to help state and local governments defray additional costs. The full fiscal impacts of the immigration bill on social service programs will require further analysis.

Other Social Service Programs

In addition to the welfare assistance programs discussed above, it is expected that population growth will result in growing demand for many other social services that are provided in this region.

The population group 65 years and older will be the fastest growing age group over the next 25 years; it is projected to double by the year 2010, growing from 1.1 million people to 2.3 million people. The growth of this age group is certain to result in much heavier demand for the many social services programs that presently serve this age group. Expansion of the following types of programs/services is expected: in-home support services (i.e., assistance with meal preparation, household cleaning, personal care services, transportation, supervision, etc.), "friendly visiting," adult day care, case management services, handicapped/disabled assistance programs, legal aid and adult protective services. Many of these programs today are sorely underfunded, with demand significantly exceeding available service levels. Demand will be even greater in the future.

The significant 47% growth predicted for the overall population over the next 25 years also is expected to increase demand for many of the region's general social services identified in the beginning of this chapter--family and personal support programs, crisis intervention programs, and various protective services.

Further, the very significant growth of the Hispanic population--from 2.8 million people in 1980 to 7.2 million people in 2010 will probably move the Catholic Church into a much more prominent role as a provider of social

services. The Archbishop of Los Angeles already has expressed a strong commitment to assist with social service needs of the Hispanic population, which is largely Catholic.

The continued entry of immigrants to the SCAG region also will make programs that are specially set up for immigrant groups increasingly important. About 3.3 million immigrants are predicted to come to the region over the next 25 years. Important social service programs that serve immigrants include Legal Aid, Translation/Cultural Transition programs, refugee assistance, community centers/services programs, adult education, and Adult English as a Second Language (ESL) programs. The Los Angeles School District offers adult ESL programs at 27 schools throughout the district at a cost of 50¢ for registration; however, these programs are notoriously lacking in relation to the demand for them, and need to be expanded. Language programs will continue to be especially valuable in helping integrate immigrants into American society, and assisting them to successfully complete secondary education and secure employment. According to the 1980 Census, 9% of Los Angeles County residents were non-English speaking, the vast majority (84%) of whom were adults. Cultural transition programs will continue to be very important, also. These programs provide new immigrants counseling and assistance in securing housing, educational services, health care and transportation. Community groups commonly offer these bicultural programs. Community centers also are an effective service to assist new immigrants in transition.

One other service that is likely to undergo greatly increased demand is child care for preschool and school age children of working parents. Child care is a growing service in this region as more and more women join the labor force. Typically, it is used by parents unable to make child care arrangements within their own homes, and is rendered in various settings such as private homes, special centers, and schools. Facilities are both licensed and unlicensed; most operate for profit; some are nonprofit and receive public subsidies for offering services to low or moderate income families. In Los Angeles County, about 35% of all licensed day care is subsidized (United Way Service Profile #703).

A major shortage of child care facilities currently exists in the region. In Los Angeles County, for example, there are 780,000 K-6 grade students enrolled in public and private elementary schools; about 240,000 of those children have working mothers and need supervised care before and after school. Yet there are only 47,000 licensed and unlicensed school age child care spaces countywide (United Way, School's Out in L. A. County, May 1986).

-
5. The DELPHI panel views child care as a very critical need for our society today and well into the future. Some panelists believe child care is a topic that really belongs in the Employment chapter of this report (Chapter 1); they believe it is more appropriately viewed as a "work support" service than a social service.

The demand for child care facilities and services will increase as more and more women are predicted to join the labor force, and as the population of children grows. The Baseline Projection predicts that the labor force participation rate of women aged 25-54 will grow from 65% in 1980 to 81% in 2010. For women aged 16-24 the rate will grow from 60% to 68%. Furthermore, the infant and preschool age population (0-4 years) is predicted to grow from 863,000 in 1980 to 1.3 million in 2010, a 53% increase. Similar growth patterns (43%) will occur in the younger school age population (5-14 years old) which often requires child care arrangements before and after school, and during evenings and weekends when some parents work. Clearly, there will be more children in the future, and more children whose parents work. If high divorce rates continue, as well as births to unmarried women, the trend and needs will be compounded.

The largest need will be for more subsidized child care to assist low income working parents. Employer-supported child care, offering child care on the work premises or in a separate facility, is in the embryonic stage, but is expected to become more prevalent as the economy becomes more accustomed to a work force that has a large percentage of women.

Issues Needing Further Consideration

- Social services include not only welfare programs that serve the poor, but also a host of other programs that serve the population-at-large, and many special population segments other than the poor. This chapter has somewhat emphasized welfare programs; however, more analysis is needed on the impacts of growth on the full range of social services provided to residents within the SCAG region. The need for these programs will continue, and demand for them is expected to grow. Costs to government will continue to be an important issue. The many private sector organizations providing social services also will continue to require financial support.
- Future policy responses need to consider closer partnerships between welfare programs and the educational system so that welfare recipients have greater opportunities and assistance in receiving training for gainful employment. Riverside County's CARE program (Cooperative Agencies Resources for Education) is an example of one such local program already being implemented.
- The Homeless problem is discussed in the Housing Chapter (Chapter 2), but really needs to be considered under the topic of social services. Homelessness has grown over the past few years, especially in Los Angeles County, and has impacted the County's General Relief program. Social service officials believe that Homelessness will continue to be a significant problem, and will need to be more integrally considered in state and local social service programs.

- Social service programs need to respond to the growing teenage pregnancy problem by stressing prevention of teen pregnancy, providing services for pregnant and parenting teens, and making opportunities available for completion of education and development of job skills.

CRIMINAL JUSTICE

The projected increase in the SCAG region's population from 12.4 million people in 1984 to 18.3 million people in 2010 has important implications for the criminal justice system. The sheer increase in population suggests that law enforcement, the court system, legal personnel, and correctional facilities (jails, prisons, juvenile facilities) will need to be expanded. Already, there is a perceived shortage of law enforcement personnel, and the region experiences a backlogged court system and overcrowded correctional facilities. Besides population growth, other factors may affect the amount and type of crime in the future, and accompanying criminal justice needs. These factors include the changing age composition, and potential changes in the demographic and socioeconomic characteristics of the population including especially education, job skills, employment status, and increasing densities.

Law Enforcement

In 1984, the SCAG region had 24,172 sworn police officers and sheriffs, for a ratio of 1.95 police/sheriffs per 1,000 population (California Department of Justice, 1984 Criminal Justice County Profiles). To maintain this current ratio with the projected 2010 population, 11,430 additional police/sheriffs would be needed, bringing the force up to 35,602. This represents a 47% increase in sworn personnel.

Yet, it seems possible that a greater than 1.95:1000 ratio will be needed, particularly in the larger, more dense cities. With the increase in density in many areas of the Southern California region by 2010, response time will probably increase. Congested conditions could impede prompt response times. To compensate, it may be necessary to increase the ratio of police/sheriffs per 1,000 population in large urban areas. Additional considerations are the public's current perception of law enforcement shortages, which also suggests the need for a greater ratio of law enforcement personnel, as does possible changes in expectations of future citizens regarding law enforcement. It should be noted that the current trend toward privatization of law enforcement in many areas of the region, as well as the increasing use of advanced security and crime deterrence technology could very well offset some of the increased need for public law enforcement.

In addition to increased law enforcement personnel, new law enforcement facilities and equipment, such as police stations, police cars, helicopters, and automated equipment, among other items, will be needed. Other police-related considerations include the need for a more racially diverse and bilingual police force.

Correctional Facilities and Courts

Both the court system and correctional facilities will need to be expanded in order to adequately deal with the predictable growth in the need of these functions. The burgeoning population estimated for the region in

2010 points to the need for additional court facilities and personnel. At a minimum, lower court systems such as municipal and superior will need to be enlarged. Increased personnel needs include judges, commissioners, marshalls, court reporters and transcribers, county clerks, grand juries and other auxiliary workers. Additionally, personnel involved with prosecution and public defense, such as attorneys, investigators, clerical workers and others, will also need to be increased. Currently, the courts are backlogged, with lengthy waits for trial the rule rather than the exception. According to the Los Angeles County Probation Department, 80% of all dispositions in court result in some form of probation, and future probation personnel needs also cannot be ignored.

Frequently, those awaiting trial or a preliminary hearing wait in jail, unable to make bail, adding to the already overcrowded conditions of local jails. It is relevant to note that jails routinely hold people waiting sentencing and being detained on bail-related issues, in addition to, and often in greater numbers than those actually serving sentences. In addition to the expected need for more local jails, the trend toward stiffer sentences (i.e., increased lengths and rates of incarceration) has led to California's tougher criminal sentencing laws, further compounding the overcrowded conditions at the local, state and federal levels. For example, the population in state prisons is over 55,000, which exceeds the state's 31,853 capacity of its existing 12 prisons. Although the public is generally reluctant to spend tax revenues on new correctional facilities, and despite the great difficulty in finding acceptable sites, the voters approved two state bond issues in 1981 and 1984 to finance the construction of 24 new state prisons that will each hold from 300 to 3,000 inmates (Los Angeles Times, August 18, 1986). The California Department of Corrections estimates that 30,000 new correctional officers will be needed statewide during the next ten years, 9,000 of them over the next two years. At this point, it seems necessary for California to increase the capacity of correctional facilities and personnel to alleviate existing overcrowding and to ensure adequate space in the future.

Other areas affected by the potential increase in adult and juvenile inmates and offenders will include the expansion of facilities such as the California Youth Authority (CYA--camps or ranches for youthful offenders), rehabilitation centers, juvenile halls, nonsecure facilities (such as shelters, counseling and educational centers), parole and probation departments.

-
6. Voters in Los Angeles County approved Proposition 52 in June 1986 and Proposition J in November 1986. These propositions are partial funding attempts to correct local correctional facility shortages. Correctional officers state that even with these propositions it will still be very difficult to build sufficient correctional institutions to house all convicted offenders. A recently published RAND report on Probation in California stresses the need for a "beefed-up" community correctional system to serve as an "intermediate sanction." Some experts believe that as the population continues to increase, there must be sufficient funding for community corrections, or the justice system may completely fail.

The overall need for additional correctional facilities may in part be offset by increased use of alternatives to incarceration for certain offenders--alternatives whose punishment involves more positive contributions to society through community work programs, etc. Many people also believe that treatment, prevention and rehabilitation need to be looked at more seriously in addition to punishment as a response to crime.

Criminal Justice Expenditures

Criminal justice expenditures encompass personnel and facility costs for law enforcement, the courts, court-related functions, corrections, prosecution and public defense. For 1984, total criminal justice expenditures were \$2.5 billion for the SCAG region, as shown below.

Table 6-1

CRIMINAL JUSTICE EXPENDITURES -- 1984 (\$000)

<u>Law</u> <u>Enforcement</u>	<u>Prosecution</u>	<u>Public</u> <u>Defense</u>	<u>Courts</u>	<u>Court</u> <u>Related</u>	<u>Corrections</u>	<u>Total</u>
\$1,646,350	140,000	50,050	186,200	105,500	361,150	\$2,489,250

Source: California Department of Justice, 1984 Criminal Justice County Profiles.

Since 1975, law enforcement costs have consistently comprised above 66% of the region's criminal justice costs. Not surprisingly, costs have increased yearly, especially each year since 1979. Expenditures have grown more than proportionally to the population, due to numerous factors including inflation, more sophisticated equipment and facilities, the growth of specialized law enforcement units (e.g., drug enforcement), and increased sentencing.

Existing Crime Rates and Potential Effects of Increasing Density

Along with the large expected increment of population growth in the SCAG region is a probable increase in the amounts of crime. Whether this increase in crime will be directly proportional to the population increase, or affected by other factors as well, is discussed in this section and remaining ones.

-
- Delphi panel criminal justice experts believe that if inflation were taken into account, expenditures would show that even though more dollars are being spent on criminal justice programs in comparison to past years, less real funding is actually being directed toward criminal justice programs when inflation is taken into account.

The California Crime Index, which is often used to express the crime rate, includes selected violent and property crimes reported per 100,000 population. Violent crimes are crimes against a person, including homicide, nonvehicular manslaughter, rape, robbery, and assault. Burglary and motor-vehicle theft comprise the category of Property Crime. These crimes elicit the most attention and concern among the public, possibly due to sensationalism and fear. However, "white collar" and computer crimes, which affect business operations, jobs, cost of doing business, and public confidence should not be overlooked, even though they are not accounted for in the crime rate.

The most recent available statistics of crime by county are for 1984, as shown in Table 6-2. It is interesting to compare the crime rates of the six Southern California counties.

Table 6-2

1984 CRIME RATES BY COUNTY

County	1984 Pop.	Density (People/ Urban Acre)	Violent Crime/ 100,000	Property Crime/ 100,000	Crime Index/ 100,000
Los Angeles	7,867,000	12.7	1,200	2,950	4,150
Orange	2,066,000	11.1	430	2,140	2,570
San Bernardino	1,014,000	7.3	730	2,530	3,260
Riverside	757,000	5.6	630	2,790	3,420
Ventura	580,000	8.3	320	1,620	1,940
Imperial	102,000	6.3	620	3,020	3,640

Source: California Department of Justice, 1984 Criminal Justice County Profiles.

As might be expected, with its much greater population and higher density, Los Angeles County has the highest crime rate at 4,150 per 100,000. This follows a nationwide pattern of the largest urban areas having the highest crime rates. Surprisingly, for the remainder of the counties there is no sequential order for the crime rates based on county population or density alone. Although Orange County is second in population and density only to Los Angeles, its crime rate is much less than San Bernardino, Riverside and Imperial. Ventura County also has a relatively low crime rate. Significantly, the greatest differences regard the incidence of violent crime. Los Angeles County's rate of violent crime is approximately at least twice as much as the other counties, except San Bernardino which rates 730 compared to Los Angeles' 1,200. It also seems unusual that Imperial County, the smallest county (in terms of population and urban land), has a rate of property crime, 3,020, which is greater than Los Angeles' 2,950. Although in extremely large cities, size and density seem to influence crime, there are obviously other factors, demographic and socioeconomic, which influence the crime rate. Outside of the very large central cities, density, by itself, does not seem to have a direct correlation to crime rates.

Nationwide statistics show that generally, the larger the city, the higher the crime index. A major implication is that with an increase of over six million people, the region is going to have an overall increase in the size of its cities. This points to a possible increase in the crime rate for the Southern California region. When looking at types of cities, such as large central cities, medium-large central cities, suburbs and rural areas, the crime index decreases as the population of the city decreases. According to the Statistical Abstract of the U. S. 1985, these rates were 8,640, 7,694, 4,184, and 1,990 per 100,000, respectively, for those types of cities in 1983. Although crime is increasing in all areas, whether urban, suburban or rural, the areas with the greatest populations have the highest crime rates. It seems that crime is not solely a consequence of size and population, but also due to conditions often found in large urban areas, such as unemployment and poverty.

The City of Los Angeles, the largest city in the region, containing 3.1 million people or 40% of the total population of Los Angeles County, has a relatively high crime rate when compared with other U. S. cities with populations of more than 250,000 in 1983. Using data from the Statistical Abstract of the U. S. 1985, the average violent crime rate in large cities was 1,294 per 100,000 compared to Los Angeles' 1,692, a difference of 31%. For property crime, the City of Los Angeles' rate was 9.5% greater, 8,044 per 100,000 versus the average of 7,345. Los Angeles' crime index total was 9,735 per 100,000 compared to the average of 8,639. Los Angeles' crime of 9,735 ranks third; the only major cities with higher rates are Detroit with 12,900 and Dallas with 10,793 per 100,000. Even New York has a crime index of 8,773, which is fifth of the fourteen top ranked cities.

Effects of Changing Demographics on Crime

Males 15-29 years old are responsible for substantial amounts of violent and property crimes committed in the SCAG region, as shown in the following table.

Despite constituting only 14.3% of the population, males between 15 and 29 years old are responsible for 61% of total violent crime arrests and 65% of all property crime arrests as shown in the following table. Their percentage is projected to decrease by 2010 to 11% relative to the remainder of the population, but their actual numbers are predicted to increase by 21.4%, from 1,660,000 to 2,010,000. It is significant that this age group would grow at a slower rate than the general population, suggesting that while absolute numbers of crime would increase, per capita crime rates could actually decrease due to the slowed growth of this crime-prone age group.

Table 6-3

CRIMINAL ARRESTS OF YOUNG MALES, SCAG REGION, 1984

<u>Age</u>	<u>Pop '80</u>	<u>Violent Crime</u>	<u>Property Crime</u>	<u>Baseline Pop. 2010</u>
15-19	529,172 4.6% of Total Pop.	9,161 21.8% of Total Viol. Crime	22,189 27.3% of Total Prop. Crime	629,014 3.4% of Total Pop.
20-24	580,870 5.0% of Total Pop.	10,169 24.1% of Total Viol. Crime	17,439 21.5% of Total Prop. Crime	659,733 3.6% of Total Pop.
25-29	547,200 4.7% of Total Pop.	6,447 15.3% of Total Viol. Crime	13,190 16.3% of Total Prop. Crime	723,160 4.0% of Total Pop.
TOTAL 15-29	1,657,242 14.3% of Total Pop.	25,777 61.2% of Total Viol. Crime	52,818 65.1% of Total Prop. Crime	2,011,907 11.0% of Total Pop.

Source: California Department of Justice, 1984 Criminal Justice County Profiles.

It is interesting to note the projected differences in growth rates among the different ethnic components of males aged 15-29 years. In general, the nonWhite groups will grow faster. While NonHispanic Whites in this age group will decrease 26%, Blacks increase 42%, Asian/Others increase 52% and Hispanics increase 100%, as shown below.

Table 6-4

MALES 15 TO 29 BY ETHNICITY

	<u>NH White</u>	<u>Black</u>	<u>Asian/ Other</u>	<u>Hispanic</u>	<u>Total</u>
1980	921,053	153,950	103,984	478,255	1,657,242
2010	679,572	218,606	157,978	955,751	2,011,907
Change Relative to 1980	-26%	+42%	+52%	+100%	+21%

Source: SCAG Draft Baseline Projection.

Currently, Blacks and Hispanics are 9.0% and 24.2% of the population (see Table 6-6), respectively. They are responsible for 40.8% and 30.8% of all violent crime arrests, and 30.8% and 34.6% of all property crime arrests. (See Table 6-5.) The percentage of violent and property crime arrests by the NonHispanic White and Asian groups is considerably lower than the percentage of total population they represent. In many instances, the perpetrator and victim of crime belong to the same ethnic group. It is very critical to note that these statistics only cover violent and property crimes. If other types of crime are included, such as white collar and computer crime, the distribution of total crime among ethnic and age groups might be very different. In addition, many people are uncomfortable with reporting crime by ethnicity or race because it implies that crime is a direct function of race, when in fact, it seems much more closely correlated with many other variables, including low income, wherein the Black and Hispanic populations are much more overrepresented than the other major ethnic groups.

Table 6-5

VIOLENT AND PROPERTY CRIME ARRESTS AMONG ETHNIC GROUPS IN SCAG REGION --
1984

<u>Type of Crime</u>	<u>NH White</u>	<u>Black</u>	<u>Asian/ Other</u>	<u>Hispanic</u>	<u>Total</u>
Total Violent Crime-- by Adults and Juv.	11,499 25.4%	18,417 40.8%	1,346 3.0%	13,929 30.8%	45,191 100%
Total Property Crime-- by Adults and Juv.	24,674 31.5%	24,142 30.8%	2,469 3.1%	27,062 34.6%	78,347 100%

Source: California Department of Justice, 1984 Criminal Justice County Profiles.

By 2010, Blacks and Hispanics will be 10.2% and 39.5% of the total population (see Table 6-6). Given the relatively higher property/violent crime rates among the Black and Hispanic groups, a key question is whether these types of crime will increase as these ethnic groups increase. This is an extremely difficult question to answer. Crime is not "ethnically-driven," but is rather a large function of income and unemployment levels, as well as other factors such as educational attainment. The extent to which crime could increase will depend heavily upon economic and educational opportunities that are available to the ethnic poor.

Table 6-6

ETHNIC DIVERSITY OF POPULATION IN SCAG REGION

	<u>NH White</u>	<u>Black</u>	<u>Asian/ Other</u>	<u>Hispanic</u>	<u>Total</u>
1980	60.6%	9.0%	6.2%	24.2%	100%
2010 Projected	41.0%	10.2%	9.3%	39.5%	100%

Source: SCAG Draft Baseline Projection.

Another important issue when examining patterns in crime is youth gangs. The Los Angeles area has a high and increasing incidence of gang activity within and among all major ethnic groups. Although most prevalent in lower income neighborhoods, gangs can be found among all socioeconomic levels. Frequently, gang-related crime and conflicts are related to drug trafficking and "turf." Drugs contribute immensely to crime and greatly affect current statistics. Whether in terms of drug use, possession or sale, criminal acts to obtain money for drugs or violent actions relating to drugs, drugs are often intertwined with various types of crimes. Contributing factors such as high school drop-out rates, unemployment rates, job opportunities, job skills and ethnic tensions need to be addressed. A crucial question is whether the current trend of increased gang and drug activity will continue in the future, especially with the additional factor of increased ethnic diversity in this region. Will the national interest and campaign against drugs have a visible effect in reducing drug use, and thus, drug-related crime? Steps need to be taken to counteract the appeal of drugs and gangs. Youth need to be given alternatives. "Don't do it" is not good enough. They need to be shown what to replace drugs and gangs with.

Additional Influences on Crime Rates

Additional relevant factors with potential influences on the crime rate include changes in the economy, lifestyles, possible changes in social values, increased emphasis on private security measures, and building types and configurations. In terms of the economy, the move to an information-based and computer-based society may give rise to more white collar crime and electronic theft, while resulting in less robbery, purse-snatching and pickpocketing. Lifestyle changes may see a decrease in "traditional" families due to the increase in the divorce rate and more women in the workforce, resulting in more vacant homes during the day (burglary targets) and a lack of parental supervision and influence. On the other hand, there is the possibility of more people working at home in the future, which could reduce daytime burglaries.

Future changes in social values may encompass new attitudes and expectations towards the police, criminal activity and acceptable means of self-protection. For those who can afford it, private security measures

are in much greater use, including private security services, extensive burglar alarm systems and even neighborhood watch groups. These measures serve as very effective deterrents to crime, and reduce the demand in municipal law enforcement. Many new residential developments are offering security measures as part of the entire package. Future building types and configurations will also influence desirability for illegal activities, depending on characteristics such as visibility, access, privacy and view. Finally, the success of various drug control effects at the national and local levels will influence crime.

Summary

Now is the time to evaluate and examine our current criminal justice system and shape it so that despite the changes during the next 25 years, it will be efficient and effective. It is important to address the criminal justice system in terms of crime control (laws, methods of enforcement, equity, focus and penalties) and crime prevention, which pertains to casual factors. Additional police personnel and facilities are necessary and basic to maintain a sense of well-being in physical, psychological and material aspects. Expansion must be comprehensive; it will need to occur in all areas related to criminal justice, including the courts and correctional system. Yet, much more is at issue. The increase and change in population promotes speculation as to what will be required to maintain public safety and deal with offenders both in the court system and with regards to punishment. Consideration of these impacts also further emphasize the critical importance of education and job training for the changing labor force, and of strengthening our institutions established to develop community cohesion and social responsibility. The economic projections contained in the Baseline Projection offer the prospect of a growing economy and many future opportunities that could potentially lower overall crime in the SCAG region.

Issues Needing Further Consideration

- The number of law enforcement officers in relation to amounts of population in the SCAG region, or at least in the City of Los Angeles, should be compared with other major cities across the country. It is likely that this region is underrepresented in terms of officers in comparison with Eastern counterparts. Similarly, other members of the criminal justice system should be compared, i.e., prosecution, public defense and corrections. The number of police officers per 1,000 population should be examined from the past to present and compared to crime rates.
- The chapter is heavily weighted in favor of law enforcement, and should reflect how the rest of the criminal justice system may be specifically affected by growth (courts, prosecution and corrections). The criminal justice system will be ineffective if action is only directed toward the law enforcement portion.

- Data should be developed depicting population and crime trends over a historical perspective. Caution needs to be used in not portraying a simple cause-effect relationship between population growth and crime.
- An emerging issue needing examination is the fact that more and more children are being raised within the criminal justice system. The need for more youth role models to move youth from alienation and social dysfunction to social integration is also important.
- Future policy responses need to look increasingly to the schools for promoting crime prevention. There are opportunities for using the education system more effectively for drug and gang prevention.
- The predicted rapid growth of skilled jobs in the economy does not necessarily mean job opportunities for especially poor youth. Fewer opportunities could ultimately lead to potentially higher crime. Educational and job opportunities for the poor need to be considered more closely.

GOVERNANCE

Changes in The Number and Size of Local Governments

With the projected population growth of 5.9 million people to the region during 1984-2010 (a 50% increase) it is highly likely that new cities will be created in unincorporated areas, and major annexations will occur in several existing cities. Incorporations will most likely occur in rapidly urbanizing unincorporated areas of counties where the population reaches a certain level and density that makes it feasible or desirable to incorporate for the following reasons: greater political autonomy, better services, community identity and also quite possibly, the desire to control the pace, scale and nature of development. In addition, annexations are likely in many areas where growth occurs contiguous to existing city boundaries.

Along with the creation of new cities and the boundary expansion of existing ones will likely be many changes in special district service areas and boundaries, as well as new contractual arrangements needed among jurisdictions.

The effects of growth in spurring the creation of new jurisdictions is apparent by examining the seven new cities that have been incorporated over the last few years: Agoura Hills, La Quinta, Big Bear, Cathedral City, Moorpark, Moreno Valley, and West Hollywood. Most of these new cities are located in areas that have undergone rapid urbanization. Numerous annexations, both major and minor, also have been made in areas where growth has occurred adjacent to existing cities.

The following table compares 1984 population in incorporated vs. unincorporated areas of each county with the population that is projected in these same areas in 2010 under the Baseline Projection. The projections for incorporated areas include only growth that will occur within existing city boundaries. Similarly, the projections for unincorporated areas include growth occurring in existing unincorporated areas and do not reflect potential incorporations or annexations occurring within these areas. Thus, the 2010 projections do not reflect potential annexations or incorporations that will occur between now and 2010.

The primary value of the table is that it shows relative amounts of growth occurring in incorporated vs. unincorporated areas. Where large amounts of growth are going to unincorporated areas, we may expect to see future annexations and incorporations; this would occur in nearly every county. Regionwide, 3.7 million people would be added to incorporated areas, while 2.1 million people would be added to currently unincorporated areas.

Political Representation and Redistricting

The ethnic diversification and growth that is projected to take place over the next 25 years has major implications for changes in political representation and redistricting within city, county and state governments. As

Table 7-1

POPULATION IN EXISTING INCORPORATED AND
UNINCORPORATED AREAS OF SCAG REGION

<u>County</u>	<u>1984¹</u>	<u>2010 Baseline Projection</u>	<u>Added 1984-2010</u>
Ventura			
Incorporated	485,400 (84%)	780,700 (79%)	295,300 (72%)
Unincorporated	94,500 (16%)	208,400 (21%)	113,900 (28%)
Los Angeles			
Incorporated	6,849,000 (87%)	8,317,800 (84%)	1,468,800 (73%)
Unincorporated	1,017,900 (13%)	1,573,500 (16%)	555,600 (27%)
Orange			
Incorporated	1,778,600 (86%)	2,429,100 (80%)	650,500 (66%)
Unincorporated	287,900 (14%)	625,700 (20%)	337,800 (34%)
Riverside			
Incorporated	454,600 (60%)	1,150,300 (59%)	695,700 (58%)
Unincorporated	302,900 (40%)	806,000 (41%)	503,100 (42%)
San Bernardino			
Incorporated	653,700 (64%)	1,227,600 (56%)	573,900 (48%)
Unincorporated	360,800 (36%)	977,400 (44%)	616,600 (52%)
Imperial			
Incorporated	73,400 (72%)	119,000 (75%)	45,600 (79%)
Unincorporated	28,300 (28%)	40,300 (25%)	12,000 (21%)
TOTAL			
Incorporated	10,294,700 (83%)	14,024,500 (77%)	3,729,800 (64%)
Unincorporated	2,092,300 (17%)	4,231,300 (23%)	2,139,000 (36%)

¹ California Department of Finance Population Estimates, May 1984 (Report 84E-1).

shown elsewhere, the "minority" population, consisting of Hispanics, Blacks and Asians/Others, is projected to increase from 40% to 60% of the entire population during 1980-2010. The NonHispanic White population will make up about 40% of the population, as will the Hispanic population.

Although minorities today make up 40% of the population, there is certainly not equivalent political representation by minority elected officials, or nonminority officials representing the interests of minorities in city, county, or state governments. As the minority population grows, this representation will become even more important. Today's lack of minority representation is often attributed to factors such as the following:

1. Lack of sufficient economic resources for nominating/electing minority representatives.
2. Lack of opportunity for minorities to be in appointed positions as a step to elected office.
3. Lower voter registration and voter turn-out by minorities.
4. Lack of identification and relationship with the political process by newer immigrants.

These are all problems that are well-known by the various ethnic communities, and will need to be solved if political representation is to be increased commensurate with the numbers represented by minorities.

Another important factor will be attaining equitable district boundaries within city, county and state governments, such that the political strength of dominant ethnic groups in particular areas is not diluted or bifurcated by boundaries that split ethnic communities. This is a problem currently faced in Los Angeles City where 28% of the city's population is Hispanic, yet where Hispanics until recently made up the majority in only one of the 15 council districts. The City has recently prepared a redistricting plan to create a second heavily-Hispanic district, in response to a U.S. Justice Department lawsuit alleging that the city's 1982 reapportionment discriminated against Hispanics by diluting their voting strength.

In summary, as minority populations grow within areas of the region, and as their locational patterns change, these changes will have a major impact on the local and state political processes. From a government standpoint, it appears certain that various political district boundaries will need to be changed pursuant to the federal Voting Rights Act in order to assure adequate voting strength and representation by today's minority population that will actually become tomorrow's majority population.

Community Involvement in the Local Government Process

Based on the large quantity of growth projected for the SCAG region, it appears likely that there will be strong movements by many communities to exert greater control over the amount, pace and quality of growth in their areas in efforts to preserve a certain "quality of life." This phenomenon

is already occurring in many parts of the region; efforts are underway to control growth in some communities, and to restrict the quantity of commercial or industrial development. There also is an awakening urban design concern in many communities.

The possibility exists that some jurisdictions may choose to move to modified forms of government that involve citizens and individual communities more integrally in the planning process, beyond mere advisory functions and into more decision-making functions. This could take the form of official community planning councils of some sort that work with the jurisdiction's planning commission, and council or board. This trend would probably occur especially in medium and large jurisdictions which are often composed of numerous different communities, each of which has particular concerns they wish heard and acted upon.

The NIMBY Syndrome (Not In My Backyard) also is expected to become more pervasive on a number of issues over the next several years as the region continues to grow. These issues will relate to siting of new or expanded facilities to serve growth (surface, transportation, airports, solid and hazardous waste, prisons, etc.), locating new development, and preservation of existing natural resources from the effects of development. It seems certain there will be an increasing need for mechanisms at both the local and regional levels to sort out and allocate equitable shares of responsibility and costs among affected jurisdictions. This is already being experienced in the hazardous waste treatment area, for example.

Other Challenges Facing Local Governments

The job of local governments is going to become more complex and challenging as the region continues to grow. Decisions will become more complex regarding land use matters and the location and amount of new development. Public finance will continue to present challenges regarding the provision of needed services and facilities. A future of less federal funding will require creativity in cost-effective delivery of services and provision of facilities, as well as cash management. The management of public finance will need to become even more sophisticated with the development of new instruments as well as new approaches to traditional techniques.

Basic policy questions will revolve around decisions about the allocation of resources among present and future generations; responsibility for the cost of services and facilities among the various jurisdictions and levels of government, and the private sector; and the amount and combination of revenues to support services and facilities. Decisions about the allocation of resources between maintenance of facilities and capital outlay for facilities will also continue to face local governments.

NEIGHBORHOOD/COMMUNITY

Determining the impacts that significant additional population growth and changes in the region's ethnic composition could have at the neighborhood and community level requires a comprehensive overview of numerous factors. Before examining specific neighborhood/community impacts, it is important to review the amount, distribution, and type of growth predicted for the SCAG region in the Baseline Projection, which is done in the first section. The differing impacts of various types of physical changes, such as urban intensification, commercialization, and community redevelopment are then examined. As a consequence of these phenomena, the quality of life in individual communities is likely to change. "Livability" issues examined include factors such as density, inter/intracommunity accessibility, availability of amenities and public facilities, safety and security, and neighborhood cohesion and stability. Additionally, actual changes in the region's population, as predicted for 2010, in terms of ethnicity, age distribution, and residential status (i.e., born in region, immigrant or in-migrant, from another part of the U.S.) will likely affect the composition and characteristics of individual neighborhoods and communities. These variables are addressed in this section.

Communities are comprised of residential neighborhoods, commercial and even industrial areas, and are usually subareas of cities or unincorporated areas. Large cities tend to have a large number of geographically-defined communities. The neighborhood is a more personal level, usually consisting of the immediate surroundings of a particular residential area. There are hundreds and perhaps thousands of neighborhoods that make up this region.

Growth Trends by County

Substantial increases in population are projected to occur among all six SCAG region counties (Table 8-1). The percent increase in total population by county ranges from Los Angeles' low of 23% (due to it being the largest county, and despite having the largest numerical increase in population) to Riverside's 166% increase.

To fully comprehend the magnitude of growth, it is important to consider the actual increase and percent increase in counties, keeping in mind the region's current population. Although it is projected that Los Angeles will continue to attract the greatest numerical increases in population, Riverside, San Bernardino and Orange Counties are close, with anticipated growth of over one million persons each. The emphasis of growth in Los Angeles and Orange counties will likely be more through increased infill and recycling rather than new land development, due to the relative lack of vacant developable land in these two counties. Exceptions in these two counties would be urbanizing Santa Clarita Valley, North Los Angeles County and Southeast Orange County, all of which have considerable vacant developable land. San Bernardino and Riverside Counties, with their large anticipated growth and their large supply of vacant, developable land, are likely to have a higher incidence of new development on raw land and the

Table 8-1

POPULATION CHANGES BY COUNTY--
BASELINE PROJECTION

County	1984 Pop.	% of Total	2010 Pop.	% of Total	Added Pop.	(Growth) % Increase
Los Angeles	7,862,700	63.5%	9,638,900	52.8%	1,776,200	23%
Orange	2,066,500	16.7	3,097,500	17.0	1,031,000	50%
San Bernardino	1,014,400	8.2	2,308,200	12.6	1,293,800	128%
Riverside	757,500	6.1	2,017,200	11.0	1,259,700	166%
Ventura	580,000	4.7	1,028,500	5.6	448,500	77%
Imperial	<u>101,700</u>	<u>0.8</u>	<u>165,500</u>	<u>0.9</u>	<u>63,800</u>	<u>63%</u>
Total	12,382,800	100.0	18,255,800	100.0	5,873,000	47%

Table 8-2

10 FASTEST GROWING SUBREGIONS--
POPULATION

	1984	2010	Added Population	Percent of Regional Increase
Highly Urbanized				
Glendale/Pasadena	1,202,000	1,452,000	250,000	4.3
San Fernando Valley	1,177,000	1,428,000	251,000	4.3
E. San Gabriel Valley	739,000	1,159,000	420,000	7.2
<u>Total</u>	<u>3,118,000</u>	<u>4,039,000</u>	<u>921,000</u>	<u>15.8%</u>
Urbanizing				
Southeast Orange	641,000	1,437,000	796,000	13.6
Chino	401,000	1,020,000	619,000	10.5
Riverside/Corona	378,000	858,000	480,000	8.2
E. San Bernardino Valley	379,000	706,000	326,000	5.6
Central Riverside	196,000	658,000	462,000	7.9
<u>Total</u>	<u>1,995,000</u>	<u>4,679,000</u>	<u>2,683,000</u>	<u>45.8%</u>
Mountain/Desert				
San Bernardino Desert	192,000	489,000	297,000	5.1
Riverside Desert	177,000	486,000	309,000	5.3
<u>Total</u>	<u>369,000</u>	<u>1,975,000</u>	<u>606,000</u>	<u>10.4%</u>
Total Growth of 10 subregions			4,210,000	72.0%
(Total Growth for Region:			5,873,000	100.0%)

Source: SCAG Draft Baseline Projection.

development of whole new communities. It's likely that Imperial and Ventura counties also will follow San Bernardino and Riverside counties pattern of growth, due to their lower density and available land.

In examining projected population growth by subregions (Table 8-2), 72% of the growth between now and 2010 is predicted to occur in 10 of the 23 subregions, namely (in order of absolute increase): Southeast Orange, the Chino Basin, Riverside/Corona, Central Riverside, East San Gabriel Valley, East San Bernardino Valley, the Riverside Desert, the San Bernardino Desert, the San Fernando Valley, Glendale/Pasadena. Of these, only Glendale/Pasadena, East San Gabriel Valley and the San Fernando Valley are already highly urbanized, with well over one-half of their land area urbanized. Besides the Riverside and San Bernardino Deserts, which are categorized as mountain/desert subregions, the five remaining subregions are all currently "urbanizing." Mountain/desert subregions are defined as predominately rural, while urbanizing regions are defined as having less than one half of their land area urbanized. This pattern of growth suggests that much of the increase in population will be in relatively "newer" outlying areas--areas that were previously in the process of developing, undeveloped or even rural. The amount of growth to the urbanizing subregions of Southeast Orange and the Chino Basin would be so great that by 2010 they would become by definition, highly urbanized.

Urbanization Processes

The large numerical increase in the population implies an overall increase in the size of many of the region's existing cities, the establishment of entirely new cities and the development of new communities within existing cities or unincorporated areas. The emphasis of new residential development will be more on multifamily housing than on single-family detached homes. For example, 59% of new housing in the region is projected to be multifamily, compared with the current stock which is 42% multifamily. In highly urbanized subregions, 86% of new housing is projected to be multifamily, compared to the current 48%. And in urbanizing subregions, 44% of new housing would be multifamily, compared with the current 31%. Many suburban and outlying areas will become more urbanized, due to their growth, expansion, and commercialization. The consequences of increased population for the region on neighborhoods and communities are examined in this section and the following ones in relation to commercialization, community redevelopment, neighborhood cohesion/stability and various quality of life indicators.

One change likely to accompany the growth levels in the Baseline Projection is the greater mix of commercial uses within or adjacent to residential neighborhoods/communities. This includes both office buildings and commercial strips, which often encroach on and can alter neighborhoods in numerous ways, depending on the amount of and type of developments and the initial characteristics of the neighborhood. Office buildings may provide jobs or merely attract workers from other communities. Conversely, retail and (personal) service stores are designed to serve or provide consumption goods for a community. Further compounding this change is the likely increase in traffic, congestion, noise and possible displacement of some

residences. Increased commercialization sometimes splits communities into two factions, those for commercial growth (usually business interests) and those against, who are frequently homeowners. The question of growth, which encompasses much more than commercialization, is a crucial issue for communities since it directly relates to their identity, character, quality of life, and revenue base. (Voters in Los Angeles City recently passed Proposition U, which restricts the amount of commercial building in specified parts of the City.)

Currently there is a proliferation of corner and strip commercial centers in the City of Los Angeles and other highly urbanized cities. Being in the neighborhood, these are highly accessible to nearby residents and designed for walk-through traffic, as parking is limited. As the population of the SCAG region undergoes densification, corner and strip commercial centers will probably increase throughout the six counties, particularly in the more dense areas. Many suburban areas will become more urbanized due to their growth and increased commercialization.

Cities and communities that have vitality today may undergo various changes and aging during the next twenty-five years and may be in need of redevelopment. While redevelopment is known for renovating economically depressed areas (usually older and declining neighborhoods/communities), it is often criticized for the displacement factor. Among those in the actual path of redevelopment there is a fear of possible or actual displacement due to the demolition of residential dwellings or the likelihood of higher rents as the area is made more attractive. Another common outcome is an increase in density, depending on the type of redevelopment undertaken. Frequently, for those areas that remain residential, changes in household type, age composition of families, income level, ethnicity and lifestyle are evident. The composition of a neighborhood's residents, whether most households consist of single adults, professional workers, families with young children or retired people, has direct implications for the use of and need for amenities, acceptable levels of congestion, and many other considerations.

The restoration of aging residential and downtown neighborhoods in Pasadena recently has added immensely to the character, quality and profitability of those areas. Bunker Hill, one of the largest redevelopment projects ever undertaken in the United States, led to the complete transformation of downtown Los Angeles and facilitated its emergence as one of the leading West Coast and "Pacific Rim" financial centers. Increased density, displacement and socioeconomic changes have resulted, but to many people, the overall economic, social and cultural benefits outweigh many of the criticisms. Other communities may follow similar patterns as they need revitalization. For the SCAG region, redevelopment is likely to continue in older portions of Los Angeles County, and in older sections of the other counties as they age.

Changes in the Quality of Life of Neighborhoods/Communities

The significant growth and urbanization predicted for this region over the next 25 years will undoubtedly influence the "quality of life" in many

communities and neighborhoods. Whether the changes are positive or negative will be a matter of individual perception and personal preference. Livability for communities and neighborhoods may be influenced by changes in density, environmental quality, inter/intracommunity accessibility, availability of amenities and public facilities, feelings of safety and security, and neighborhood cohesion and stability.

Density standards vary by culture and region, and crowding is largely a matter of perception. In comparison to other societies, our Western culture views a relatively low density as desirable or even mandatory. Our current norms regarding personal space and crowding may be altered by increasing population and higher densities in the future. Density can be viewed in terms of population per urban square mile, by the physical closeness, height, scale, size and locational distribution of buildings, and by levels of traffic and congestion.

Projected changes in population density per urban square mile by subregion under the Baseline Projection can be examined in Table 8-3. Population density would increase most significantly percentage wise in the subregions of Los Padres, Central Riverside, North Los Angeles, the Santa Clarita Valley, the Santa Monica Mountains, the Chino Basin and the East San Gabriel Valley. Such rapid increases in population density will undoubtedly alter communities within these subregions but it is important to point out that the population densities will remain low in many of these subregions relative to many other subregions. There are many other subregions in the SCAG area that are projected to undergo larger or similar increases in population (most notably, Southwest Orange, Riverside/Corona, and East San Bernardino Valley), but their increases in overall density will not be as dramatic because most growth will be spread out. Despite all of the growth of the region, no subregion will approach the current and projected population density of Central Los Angeles, which is projected to remain relatively constant, decreasing slightly from 11,680 to 11,630 persons per urban square mile in 2010. The reason for the slight decrease in Central Los Angeles is that most new urbanized land would be for commercial/industrial uses. By 2010, all of the urbanizing subregions will still have half or less the density seen in Central Los Angeles. Despite significant population growth, and significant urbanization of new land (50% increase in urban acres), the region's density will not be dramatically higher. In highly urbanized subregions, the average density (population per square mile) would increase from 7,860 to 8,310; in urbanizing areas, from 4,320 to 4,870.

Future building styles, scales and configurations will influence the density and character of communities and neighborhoods. For example, the atmosphere and character of a residential neighborhood may be extremely different depending on whether it is comprised of single-family detached homes, three-story condominiums or high-rise apartments. Similarly, the amount of pedestrian congestion and vehicular traffic that occurs during peak hours or even nonpeak hours will influence feelings about density in individual communities and neighborhoods. However, increased density in the SCAG region will not be completely negative; there are positive aspects associated with density increase, such as increased amounts, varieties and

Table 8-3

POPULATION DENSITY BY SUBREGION
(Population/Urban Square Mile)

<u>Subregion</u>	<u>1984 Baseline Projection</u>	<u>2010 Baseline Projection</u>	<u>Numerical Change</u>	<u>Percent Change</u>
Highly Urbanized				
E. San Gabriel Valley	5730	6820	1090	19
Glendale/Pasadena	7800	8850	1050	13
San Fernando Valley	6540	7070	530	8
Long Beach/Downey	7420	7960	540	7
Northwest Orange	7460	7830	370	5
Santa Monica Bay	7720	8130	410	5
Central Los Angeles	11680	11630	(-50)	(-4)
Average	7860	8310	451	6
Urbanizing				
Central Riverside	2080	3430	1350	65
Santa Clarita Valley	3720	4800	1080	29
Santa Monica Mtns.	2770	3570	800	29
Chino Basin	4460	5460	1000	22
Simi/Thousand Oaks	4540	5000	460	10
Riverside/Corona	4610	4990	380	8
E. San Bernardino Valley	4570	4700	130	3
Southeast Orange	5480	5600	120	2
Oxnard/Ventura	5080	4980	(-100)	(-2)
Average	4320	4869	548	13
Mountain/Desert				
Los Padres	500	1300	800	160
North Los Angeles	1700	2730	1030	61
Riverside Desert	3050	3520	470	15
San Bernardino Desert	3430	3620	190	6
Imperial	3630	3850	220	6
San Bernardino Forest	1440	1500	60	4
Idyllwild	3400	3825	425	13
Angeles Forest	600	580	(-20)	(-3)
Average	2585	3113	528	20

dispersal of activities and excitement due to an increase in population and greater ethnic diversity. Higher densities also offer the opportunity for certain amenities that would otherwise not be feasible (e.g., stadiums, music centers, museums). To ensure the quality and livability of neighborhoods, issues such as generally higher population densities, building sizes and configurations, and traffic congestion need to be anticipated and addressed in order to mitigate the negative aspects that may be associated with them.

Intercommunity and intracommunity accessibility primarily concern possible means of transportation, roads and other connections between and within communities. Due to the population and economic growth projected in the Baseline Projection, it is important that linkages between communities be maintained or improved. Will various community areas and facilities be accessible only by auto or will there be available bus routes and bike lanes? Will there be convenient ways of reaching areas, and enticements to draw people from other geographical locations? Will the density of nearby areas affect particular communities? Will certain communities become thoroughfares? A current example of this is East Los Angeles, which is bisected by many freeways and Whittier Boulevard, all of which are used as a means to, but not the final destination of thousands of commuters. Will the needs of those in individual communities be met within their area? Besides transportation, accessibility needs relate to other factors such as population, housing and economic opportunities. Will telecommuting become more prevalent over the next 25 years, to the extent that it has an impact on reducing medium and long distance commute traffic and congestion?

Amenities and public facilities are often a central focus of neighborhoods. This includes parks, recreation centers, public swimming pools and other athletic or cultural facilities. Their availability can add immensely to the appeal and offering of leisure activities to the residents of a neighborhood. The issue of availability of amenities brings up various questions, particularly in areas increasing in population. Will amenities be able to serve the greater population? It is important to consider intended uses and actual uses, by time of day, weekday or weekend and season. How will facilities in dense areas be able to expand? Are community events available and accessible? Should there be a trend towards the greater private provision of amenities, such as pools, tennis courts, basketball courts and weight rooms in residential (and even commercial) developments, especially in higher density areas? Will these private recreational facilities add a sense of community for neighborhoods?

Additionally, a sense of safety and security is important for most residents to feel comfortable in their homes, neighborhoods and communities. Unfortunately, some community amenities attract people who may cause local residents to feel threatened. This detracts from a positive sense of community and often causes resentment among residents towards outsiders. However, issues of safety and security or of preserving local open spaces, frequently can unite a neighborhood, due to a common interest or concern. Many communities have formed Neighborhood Watch groups to protect themselves and their neighbors from crime. Will concern about crime and safety increase in the future as the population increases and some communities

become more dense, possibly causing a sense of anonymity and resulting in more crime-prevention measures? Yet, knowing one's neighbors is an integral part of a sense of community. In the future, it may be necessary to facilitate the organization of neighborhood associations in order to conceptualize the feeling of a community.

Over the next 25 years, many demographic changes will affect neighborhood/community cohesion and stability. Growth within many neighborhoods/communities is inevitable, and there will be a generally older and more ethnically diverse population, both of which will have some effect. There will be 1.8 million people entering the region from other areas of the U.S., and 2.6 million leaving, which shows mobility, a nationwide trend. Cohesiveness, which is often formed when there are similar socioeconomic characteristics of residents within a neighborhood, will depend upon specific settlement patterns in the region.

Ethnic Locational Patterns

Settlement patterns by ethnicity are evident in the SCAG region. Currently, the majority of the minority ethnic groups (Hispanic, Black, Asian/Other) are concentrated in Los Angeles County. Large ethnic communities that are already established in this county, such as Central and East Los Angeles, Koreatown, and Little Tokyo, serve to draw new immigrants to these communities. The majority of the NonHispanic White population is also concentrated in Los Angeles county, but more than the other ethnic groups is more widely distributed among the other SCAG region counties.

With the projected increase in overall population and the predicted change in the ethnic composition for this region, alterations in the geographical distribution of ethnic groups are probable. As shown in Table 8-4, significant growth by 2010 is predicted in the Baseline Projection for especially the Hispanic population, but also the Asian/Other and Black populations. The growth predicted for the NonHispanic White population is moderate in comparison. A key question is whether homogeneity and a strong sense of ethnic community, or increased heterogeneity, assimilation, and integration will be the trend for the future.

The following is a brief summary of existing locational patterns among the four major ethnic groups and changes that occurred during 1970-1980, as displayed in Table 8-5. This information is taken from a recent SCAG document, Southern California: A Region in Transition, Vol. 3: Locational Patterns of Ethnic and Immigrant Groups, December 1984.

The NonHispanic White population, representing 60% of the region's population in 1980, is the most widely dispersed group among the region's six counties. Fifty-five percent of the group resided in Los Angeles County; the remainder in the other counties. Between 1970-1980, the NH White population declined by about 20% in Los Angeles County and moderately grew in the other counties. Overall, the group declined in numbers by 7%.

Table 8-4

DRAFT BASELINE PROJECTION
POPULATION GROWTH, BY ETHNICITY
(1980-2010)

	<u>1980</u>	<u>2010</u>	<u>% Increase</u>
NonHispanic White	7,026,223 (61%)	7,489,390 (41%)	7%
Black	1,040,494 (9%)	1,862,467 (10%)	79%
Asian/Other	715,663 (6%)	1,698,075 (9%)	137%
Hispanic	2,807,298 (24%)	7,207,475 (40%)	158%
Total	11,589,678 (100%)	18,257,407 (100%)	58%

Source: Draft Baseline Projection

Table 8-5

ETHNIC DISTRIBUTION BY COUNTY
(1970-1980)

	NH White		Hispanic		Black		Asian/Other		Total	
	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980
Imperial % Change	N/A	35,411	N/A	51,384	N/A	2,118	N/A	3,127	74,492	92,110 (24%)
Los Angeles % Change	5,020,084	3,985,022 (-21%)	1,045,958	2,065,503 (97%)	745,563	925,832 (24%)	224,736	501,146 (123%)	7,036,341	7,477,503 (6%)
Orange % Change	1,278,142	1,515,887 (19%)	116,859	285,722 (145%)	9,835	23,671 (140%)	22,781	107,429 (371%)	1,427,617	1,932,709 (35%)
Riverside % Change	368,123	491,808 (33%)	63,671	123,966 (95%)	20,834	30,371 (46%)	6,448	17,021 (163%)	459,076	663,166 (44%)
San Bernardino % Change	555,749	655,078 (18%)	89,174	165,837 (86%)	28,374	46,820 (65%)	7,795	27,281 (250%)	681,092	895,016 (31%)
Ventura % Change	303,868	384,903 (27%)	59,992	113,184 (89%)	6,229	10,966 (76%)	6,332	20,121 (218%)	376,421	529,174 (41%)
Total % Change	7,529,966	7,068,109 (-7%)	1,375,654	2,805,596 (100%)	810,835	1,039,848 (28%)	268,092	676,125 (151%)	9,980,547	11,589,678 (16%)

Source: SCAG, Southern California: A Region in Transition; Volume 3: Locational Patterns of Ethnic and Immigrant Groups, December 1984.

A very high percentage (89%) of the Black population resides in Los Angeles County, particularly in the southcentral area and adjacent communities. This group, more than any other, currently exhibits a pattern of concentration in one very large area, although there are sizable Black communities in the San Fernando Valley, in Orange County (Santa Ana), San Bernardino, and the Oxnard Plain of Ventura County. During 1970-1980, the Black population grew fairly high in percentage terms in outlying counties, especially Orange County, but grew most in numerical terms in Los Angeles County.

About 75% of all Hispanics resided in Los Angeles County in 1980; there are three large Hispanic communities in the central area, north, east, and southeast areas. The large 100% growth in this population during 1970-1980 was primarily felt in Los Angeles County, but there was significant growth in other counties as well. As the Hispanic population increases from 2.8 million in 1980 to an predicted 7.2 million by 2010, it is anticipated that all of the counties will experience growing Hispanic communities.

Similar to the Hispanic population, about 75% of the Asian/Other population resides in Los Angeles County. Another 15% resides in Orange County, mostly in Santa Ana, and adjacent communities. The major concentrations of this group exist in Chinatown, Koreatown, the Monterey Park area, and the southern part of Los Angeles County. During 1970-1980, the Asian group underwent the largest percentage increase (150%) of any ethnic group, due in part to the comparative smallness of the initial base population. The Asian population grew by 371% in Orange County, 123% in Los Angeles County, and at similarly high rates in the other counties.

The "mix" of ethnic groups in neighborhoods in 1980 shows some interesting patterns: Over 90% of the NH White population lived in neighborhoods where they were the ethnic majority (i.e., comprising over 50% of the population for that area). In comparison, 61% of all Blacks and 45% of Hispanics lived in neighborhoods where they were the ethnic majority. In contrast, only 3% of the Asian/Other group lived in neighborhoods where they were the majority, while over half resided in NH White majority neighborhoods.

From the preceding information, several implications seem clear. Namely, within the overall increasing heterogeneity of the region, concentrations of homogeneous areas continue. It is the homogeneous, ethnic majority neighborhoods that are likely to be ethnic communities and enclaves, primarily in Los Angeles County. Particularly for Asian/Others, but also for Hispanics, ethnic majority neighborhoods are heavily comprised of immigrants. Conversely, most White or Black ethnic majority neighborhoods consist of the native population and in-migrants. Ethnic communities ease the socialization process for new immigrants. Children of immigrants are probably more likely to leave ethnic communities for heterogeneous neighborhoods. Other counties beside Los Angeles and Orange are likely to have substantial ethnic communities by the year 2010. Although, ethnic "majority" neighborhoods seem to be decreasing overall due to increased ethnic diversity, they are increasing for Hispanics due to their large numerical increase.

When comparing locational patterns of in-migrants (those from areas outside of the SCAG region, but within the U.S.), immigrants, and the native population, differences are also apparent. While just over half of recent in-migrants to the SCAG region have chosen Los Angeles County as their initial place of residence, one-fifth have chosen Orange and one-fourth have chosen the remaining counties. In contrast, Los Angeles County is the final destination for over 80% of recent immigrants. Los Angeles County is likely to continue to contain a much greater proportion of foreign-born than other counties, but the other counties are likely to receive greater shares in the future.

An additional consideration in the locational patterns of the region's population is the influence of the changing age structure of the population, namely, the significant increase in the elderly population. Will there be a general residential preference among the elderly? Rather than being dispersed throughout the region or primarily situated in older neighborhoods, in houses that may have become too large, will the elderly show a locational preference for retirement communities, resort areas (i.e., beach and desert areas), traditional housing in urban or suburban settings, or all of the above? As mentioned in the redevelopment section, the needs and atmosphere of a neighborhood are influenced by the family size, family type and lifestyle of its residents, of which age, income, values and country of origin play a major role.

PART II
INFRASTRUCTURE

TRANSPORTATION

Trip-making, travel demand, and most likely congestion are certain to increase under any growth scenario for the SCAG region. The degree to which transportation congestion will worsen, and the magnitude of this congestion is generally based on several factors: how much growth there will be, what the transportation system will look like in the future; how people's behavior will change or adjust to accommodate congestion and delay, and what mitigation is provided to alleviate the impacts. The following analysis compares current levels of trip-making, congestion and delay with those expected in 2010 as a result of the currently adopted growth forecast (SCAG-82M), and the Baseline Projection. The analysis is organized as follows. The report then describes the impacts of the Baseline Projection on the region's aviation and port facilities and services.

GROUND TRANSPORTATION

(1) Trip Generation and Distribution:

The number of additional trips projected as a result of the increase in population, housing and employment projected under SCAG-82M and Baseline Projection. The distribution of these trips. Changes in travel time and distance patterns.

(2) 1984 Base Year Transportation Network and the 2010 Existing Plus Funded Network Descriptions:

The differences in improvements on the highway and transit networks assumed in the analysis.

(3) Current (1984) Travel Characteristics and Transportation Impacts:

Current levels of congestion, delay, miles of travel and location of congestion on the 1984 Base Year Network.

(4) 2010 Travel Characteristics and Transportation Impacts of the Baseline Projection and SCAG-82M:

A comparison of current transportation impacts with those projected under the adopted SCAG-82M Forecast and the Baseline Projection.

AVIATION

(1) Airport Capacity

(2) Implications of the Baseline Projection on the Regional Airport System

PORTS

GROUND TRANSPORTATION

The ground transportation analysis which follows is based on the model output of SCAG's transportation model. The area covered by this model, referred to as the SCAG Modeling Region includes the urbanized or urbanizing portions of five of the six counties' in the region. It does not include Imperial County or the eastern portion of Riverside and San Bernardino Counties. The numbers and measures described are approximations of human as well as transportation system behavior here in Southern California. The 1984 model results have been validated through the use of various ground counts and ridership data. To the extent that people's travel behavior in the future will be similar to today's behavior, the model results for the year 2010 system and the growth scenarios are comparable with the current year's analysis. Behavioral changes, as well as changes in the region's demographic profile, (i.e. greater concentrations of elderly or immigrant populations with different travel behavior), could result in different trip making characteristics with the attendant changes in model results.

Regional Trip Generation and Distribution

In 1984 the highway network carried a total of 40.2 million person trips daily of which 7.3 million trips were home-to-work trips. Person trips anticipated under the SCAG-82M forecast are expected to reach 51.6 million a day, an increase of 11.3 million trips over current levels of trip generation or a 28 percent increase. Under the Baseline Projection, daily vehicle trips are projected to be 13 percent higher than the SCAG-82M trip rate, increasing to 58.3 million. Home-to-work trips also increase as a result of increased population and jobs, to 9.3 million in 2010 under the SCAG-82M forecast, and to 10.5 million under the Baseline Projection. Table 9-1 shows the number of total person trips by county and the percent change between 1984 and 2010 under both growth scenarios. Table 9-2 summarizes the detailed county by county information for the home-to-work trips.

Both SCAG-82M and Baseline Projection predict the greatest percentage increase in trips will occur in Riverside and San Bernardino Counties. Riverside County will increase by 89% in 2010 under SCAG-82M; Baseline Projection forecasts a 151% increase in total trips. San Bernardino's increase is 80% under SCAG-82M, 100% under Baseline Projection. Though the Los Angeles County increase in trips is "only" 13% under SCAG-82M and 25% with Baseline Projection, this amounts to an absolute increase of over 3 million trips under SCAG-82M, and 6.3 million more trips under the Baseline Projection by 2010. The absolute increase in trips would be greater in Los Angeles County than any other county.

As with total trips, the percentage increase in home-to-work trips is greatest in the two eastern counties. Riverside is predicted to increase by 82% under SCAG-82M and 169% under Baseline Projection by 2010. San Bernardino's increase is 82% and 110%. Ventura County would increase 64%

Table 9-1

TOTAL PERSON-TRIPS BY COUNTY
(PERCENT INCREASE OVER THE 1984 BASE YEAR)
(In Thousands and Percent)

	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Region
1984	25,450	7,766	1,987	2,859	2,182	40,244
2010 SCAG-82M	28,650	10,521	3,757	5,138	3,507	51,571
(% CHANGE)	(13%)	(35%)	(89%)	(80%)	(61%)	(28%)
2010 BASELINE	31,793	12,185	4,988	5,729	3,647	58,343
(% CHANGE)	(25%)	(57%)	(151%)	(100%)	(67%)	(45%)

Source: UFMTR 4/2/86 RTP86 YR 2010 & 11/12/86 YR 2010 Baseline Person Trips by County.

Table 9-2

HOME TO WORK PERSON-TRIPS BY COUNTY
(PERCENT INCREASE OVER 1984 BASE YEAR)
(in thousands and in percent)

	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Region
1984	4,574	1,541	331	458	359	7,261
2010 SCAG-82M	5,165	2,134	602	833	587	9,321
(% CHANGE)	(13%)	(38%)	(82%)	(82%)	(64%)	(28%)
2010 BASELINE	5,661	2,387	891	964	611	10,514
(% CHANGE)	(24%)	(55%)	(169%)	(110%)	(70%)	(45%)

Source: UFMTR 4/2/86 RTP86 YR 2010 & 11/12/86 YR 2010 Baseline Person Trips By County.

under SCAG-82M, 70% under Baseline Projection; Orange County would increase 38% and 55%; and Los Angeles County would increase 13% under SCAG-82M, 24% under the Baseline Projection.

Intra-County Trip Distribution. Intra-county trips, those which begin and end within the same county, make up the greatest proportion of total daily person trips and home-work person trips currently and under either growth scenario. Table 9-3 describes the changes in intra-county home-to-work trip making under both growth scenarios and in the present. Although the intra-county trip percentage of the both total and home-to-work trips is expected to drop slightly for most counties under the SCAG-82M growth forecast and more under the Baseline Projection, Orange County is predicted to see a 2 to 4 percent increase in intra-county trip making under Baseline Projection. The increase in home-to-work trips which begin and end within the same county may reflect a greater balance between jobs and housing within the county. In contrast to Orange County's increase in intra-county trip making, Riverside County would anticipate a drop in both the total and home-to-work intra-county trips under the Baseline Projection, while experiencing an increase under the SCAG-82M adopted forecast. This may reflect the greater disparity between jobs and housing in the Baseline Projection.

Table 9-3

HOME-TO-WORK INTRA-COUNTY PERSON-TRIPS FOR COUNTIES
1984 BASE YEAR AND PREDICTED INCREASE UNDER
SCAG-82M AND BASELINE PROJECTION
(PERCENT OF TOTAL COUNTY PERSON TRIP PRODUCTIONS)

	Los Angeles	Orange	Riverside	San Bernardino	Ventura
1984	4,378	1,222	225	322	281
(% of total)	(96%)	(79%)	(68%)	(70%)	(78%)
2010					
SCAG-82M	4,938	1,700	465	604	457
(% of total)	(96%)	(80%)	(77%)	(72%)	(78%)
BASELINE	5,374	1,985	533	638	446
(% of total)	(95%)	(83%)	(60%)	(66%)	(73%)

Source: UFMTR 4/2/86 RTP86 YR 2010 & 11/12/86 YR 2010 Baseline
Person Trips by County.

Inter-County Trips. The effect of the tremendous increase in trips predicted under the Baseline Projection is graphically illustrated in the dramatic increases in home-to-work trips between counties as shown in Figure 9-1. The largest increase in home to work inter-county trip-making occurs between Riverside and Orange County, an increase of 322 percent, and in total trips an increase of 311 percent in between the same counties under the Baseline Projection. Total trips from Riverside County to Los Angeles County would increase 375 percent and home-to-work trips to Los Angeles County from Riverside County would increase 253 percent by 2010 under the Baseline Projection.

While Riverside County can expect to have the greatest increase in trips leaving the county, San Bernardino County also shows large increases in inter-county trip making under the Baseline Projection forecasts. This would occur, as with Riverside County, in trips to Orange County. The Baseline Projection predicts total trips from San Bernardino County to Orange County to increase 270 percent by 2010. Home-to-work trips to Orange County would increase 272 percent under the Baseline Projection.

Travel Distance. The average trip length in the region is 7.55 miles. The home-to-work trip characteristics are longer, the average distance of the home-work trip is 10.72 miles. Table 9-4 shows the current and predicted trip distances for all trips and for selected trip types.

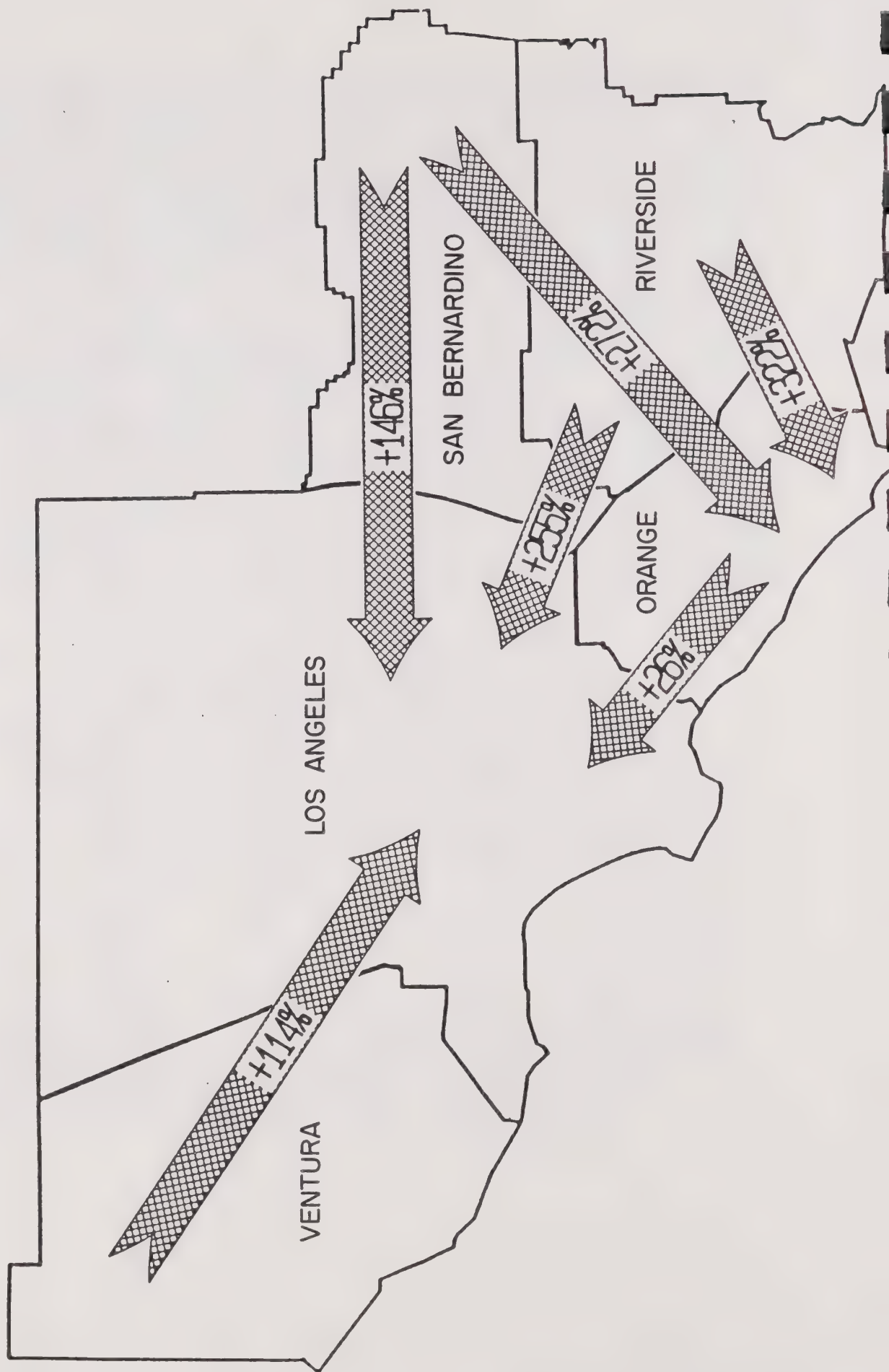
Table 9-4

REGIONAL AVERAGE TRIP LENGTH IN DISTANCE

Trip Type	1984	2010	2010
	Distance (Miles)	SCAG-82M Distance (Miles)	Baseline Distance (Miles)
Home-Work	10.72	10.91	12.42
Other-Work	8.51	8.59	8.55
Non-Work	6.61	7.13	8.01
Total	7.55	7.97	8.89

Source: UFMTR 9/30/86 RTP86 YR 2010 Total Person Trips Frequency Distribution on Time; AGM 4/1/86 RTP86 YR 2010 Person Trip Distribution - Trip Length Distribution; AGM YR 2010 Baseline Person Trip Distribution - Trip Length Distribution.

Figure 9-1
 PERCENT INCREASE IN INTER-COUNTY HOME TO WORK TRIPS
 1984 TO 2010 UNDER BASELINE GROWTH PROJECTION



The trip length for the average daily trip in the region is predicted to increase slightly to 7.97 miles under the SCAG-82M forecast and may be almost a mile longer, 8.89 miles long, under the Baseline Projection. Home to work trips are generally longer than other trips or the average of all the trips made during a day. Home to work trip length increases slightly under the SCAG-82M forecast, increasing by two tenths of a mile between 1984 and 2010. Under the Baseline Projection, the length of the average home to work trip increases by nearly two miles to 12.42. These longer trip lengths reflect the increase in the number of longer trips originating in the more outlying Riverside and San Bernardino counties which go to Orange or Los Angeles County.

Base Year and Existing Plus Funded System Descriptions

Just as population is expected to grow, road and transit systems are expected to undergo improvements over time. The amount of construction and expansion in the transportation system will depend on funding levels and numerous other factors. In order to assess the transportation impacts of growth forecasts and projections, a comparison of current system performance characteristics with a future 2010 transportation system's performance has been made. For this analysis, computer-simulated road and transit networks have been used, as described below.

The first network represents the current transportation system as it existed in 1984, the base year for analysis, and is referred to as the "1984 Base Year System". The second network, the "Existing Plus Funded Network", represents the transportation system in the year 2010 with very few additional facilities. The added facilities are only those projects which were funded in the 1984-89 Regional Transportation Improvement Program. The Existing Plus Funded system closely approximates a No Build alternative. Analyzing the high level of Baseline Projection's socioeconomic growth on this system results in significant impacts. Some of the impacts are due to the level of growth, and some of the impacts are the result of the facilities in the Existing Plus Funded network not keeping pace with the growth.

Highway Networks. The current (1984) regional transportation system was modeled to include 56,539 lane-miles of road facilities and 14,974 route-miles of transit facilities. The highway network includes all of the state highways, freeways, expressways, and major arterials. It also includes most secondary arterials, plus connector or through streets where necessary. Connectors, secondary arterials, and through streets are selected based on traffic volumes, zone size, and land use types. The region's peak-period, standard road network includes 7,009 freeway lane-miles, 40,469 arterial lane-miles, 5,350 secondary lane-miles and 3,712 lane miles of other road facilities. County lane mile and center line mile totals of both network's roadway facilities are included in Table 9-5. The increases include the construction of new facilities such as the Century Freeway (17.8 miles), the extension of Interstate 15 as a six lane freeway in Riverside County in the vicinity of Magnolia and Jurupa Avenues, the Route 30 and Route 330-spur additions in San Bernardino County and numerous road widenings and lane restripings.

Table 9-5

1984 BASE NETWORK AND EXISTING PLUS FUNDED
REGIONAL AND COUNTY ROAD FACILITY SUMMARY

	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Region
1984 BASE NETWORK						
Center Line Mi.	4,148	1,049	919	895	691	7,703
Lane Miles	31,886	8,497	5,225	6,096	4,835	56,539
EXISTING PLUS FUNDED NETWORK						
Center Line Mi.	4,176	1,058	928	902	691	7,755
Lane Miles	32,142	8,699	5,349	6,142	4,835	57,167

Source: SCAG Travel Forecast Atlas, Figure 8; 1984 Base Model (August 1985) and 1986 RTP Existing Plus Funded Network HNET.

Transit Networks. The transit facilities network in the 1984 Base Network (see Table 9-6) includes a total of 483 lines which are built from the descriptions of individual transit lines representing levels of service for the morning peak (6:30-8:30 am) period as of July 1984. Table 9-7 details the same information for the Existing Plus Funded Network. The major difference between the two transit networks is the inclusion of two light rail lines, the Los Angeles Long Beach Line and the Century Freeway Light Rail Line, in the Rail category. The decrease in the number of lines of Express Bus service is due to the elimination of duplicative lines in the corridors served by the light rail lines. The METRORAIL project is not included in the Existing Plus Funded network because funding was not finalized in the 1984 STIP.

Table 9-6
1984 BASE YEAR TRANSIT FACILITY SUMMARY

	RTD Local	Express	Other Local	OCTD Local	Rail
LINES	188	102	132	61	0
ROUTE MILES	5,912	4,045	8,842	2,344	0
VEHICLE MILES	14,430	8,842	4,185	3,662	0

Source: SCAG Travel Forecast Atlas, Figure 10; 1984 Base Model (August 1985)

Table 9-7

2010 EXISTING PLUS FUNDED TRANSIT FACILITY SUMMARY

	RTD Local	Express	Other	OCTD Local	Rail Local
LINES	188	97	132	61	2
ROUTE MILES	5,938	3,829	2,695	2,396	76
VEHICLE MILES	15,370	8,400	5,447	3,766	758

Source: INET.

Current Travel Characteristics and Transportation Impacts of the 1984 Base Network

Mobility in the Southern California region is not adequately served by today's transportation system. This is particularly the case during the morning and evening peak commute times. Delay and the number of miles of congestion are two measures of need. It is important to identify today's mobility problems and system needs before measuring future problems. This dual analysis provides the means for evaluating both today's options for more immediate solutions as well as deciding on longer range solutions needed to meet tomorrow's needs.

Vehicle Miles Traveled. In 1984, drivers in the region traveled more than 220 million miles, primarily on the freeways and the arterial roadways, and spent 6.3 million hours traveling. The majority of this travel (60 percent) did not occur during our morning and evening periods of congestion, however travelers during the peak periods experienced the most significant amounts of delay. Table 9-8 provides a breakdown of daily mileage for each county and for morning (AM peak) and evening (PM peak) peak travel periods. Daily travel in Los Angeles County accounts for slightly more than 64 percent of the total daily travel. Region-wide, the AM peak (6:30 - 8:30 AM) accounts for 13.4 percent of the daily miles traveled while the PM peak, (3:00 - 6:00 PM) accounts for 27.4 percent. The differences in vehicle miles traveled between morning and evening periods can be explained by two factors. First, the evening period is an hour longer than the morning period and second, although the average trip length of a PM peak period trip (9.68 miles) is somewhat less than the morning peak trip length (10.41 miles), the number of trips in the PM peak exceeds those made in the morning.

Table 9-8

1984 COUNTY AND REGIONAL VEHICLE MILES TRAVELED
Daily, Morning and Evening Peak Periods
(in millions)

	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Region
AM-Peak	19.3	5.7	1.6	1.8	1.2	29.6
PM-Peak	39.0	11.2	3.5	4.1	2.8	60.5
Daily	142.3	40.8	12.8	15.2	10.1	221.3

Source: 1984 UROAD 17:25 12:11:86 Summary of RTP 86 YR 1984 VMT, VHT, and Delay.

Transit Analysis. Information provided in SCAG's 1984 Travel Forecast Atlas indicates the following use patterns for the AM-Peak transit network, Table 9-9 indicates patronage of various local operators (RTD, OCTD and others) and all express lines. The total number of trips (849,000) is the total number of boardings, including each transfer as a separate trip. Forty-six percent of the express riders are able to walk to work at the end of their trip, while most of the remaining passengers transfer to a local bus to complete the home to-work trip.

Table 9-9

1984 HOME-TO-WORK TRANSIT USAGE SUMMARY

Mode	Passenger Trips (1000)	Miles (1000)	Hours (1000)	Average Miles	PSGR-MI/ Rte-Mile	Trips/ V-Mile
RTD LOCAL	484	1,230	90.7	2.54	208.0	15
EXPRESS	247	2,135	92.7	8.65	527.9	28
OTHER LOCAL	67	179	13.0	2.66	66.9	16
OCTD LOCAL	51	209	14.2	4.11	89.1	14
TOTAL	849	3,753	210.6	4.42	250.6	27

Source: SCAG 1984 Travel Forecast Atlas, Figure 25; 1984 Base Model, August 1985.

Travel Times, Speeds, and Delay. Southern Californians spend a great deal of time traveling. Table 9-10 details the hours traveled by county during the morning and evening commute periods, and on a daily basis. Here again, those areas with the most network and vehicle miles traveled experience the greatest amount of hours of travel. The amount of time expended by travelers in congestion is described as hours of delay. The amount of delay is directly related to the amount of congestion and speeds. The average speed on the region's road system throughout the day in 1984 was 35 miles per hour.

Table 9-10

1984 HOURS OF TRAVEL
Daily, Morning and Evening Peak Periods
(in vehicle hours)

	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Region
AM Peak	635,489	188,078	38,929	49,229	32,834	944,556
PM Peak	1,268,217	395,333	86,571	109,925	77,685	2,037,730
Daily	4,197,935	1,197,265	302,689	384,179	261,419	6,343,486

Source: UROAD 17:25 12/11/86 Summary of RTP 86 YR 1984 VMT, VHT, and Delay

Table 9-11 indicates number of hours of delayed travel in the region and each county. The percentages displayed below the hours indicate the percent of the hours of travel that is spent delayed, or not moving at a free flow speed on the road network. During the morning commutes in Orange County for example, 18.62 percent of the morning hours of travel are spent in delayed time due to congestion. The greatest amounts of delay are experienced in the evening and morning commute periods. Close to ten percent of the time currently spent traveling in the region is related to some form of delay.

Table 9-11

1984 HOURS OF DELAY
(PERCENT OF HOURS OF TRAVEL FOR THE SAME PERIOD¹)
(in hours and percent)

	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Region
AM Peak	110,439 (17.39)	35,012 (18.62)	2,410 (6.19)	2,661 (5.41)	1,947 (5.93)	152,470 (16.14)
PM Peak	298,219 (23.51)	92,572 (23.42)	6,316 (7.30)	7,312 (6.65)	7,332 (9.44)	411,751 (20.21)
Daily	485,195 (10.91)	137,214 (11.46)	11,233 (2.92)	10,641 (4.07)	11,327 (4.33)	628,611 (9.91)

1. Hours of travel from Table 9-10 above.

Source: UROAD 17:25 12/11/86 Summary of RTP 86 YR 1984 VMT, VHT & Delay by County and Region.

Miles of Congestion. Overall, the majority of the road system operates at satisfactory levels of service during the morning and evening, although 400 miles of the system operate at a Level of Service F, (a volume to capacity ratio >1.00) during the morning peak period. Almost double the distance, 850 miles, operate at a volume to capacity ratio of greater than 1.00 during the evening peak. The miles of congestion are concentrated on the freeways and arterials which provide the major means of moving home to work (and other) trips during the peak periods. During the morning peak, 14 percent of the freeway miles are operating with a volume to capacity ratio of 1.00 or greater. This percentage increases during the evening peak period to 23 percent of the freeway miles and 4 percent of the arterial roadways which operate at a Level of Service F. Table 9-12 details the morning and evening levels of congestion in each county and the region by volume to capacity ratios.

The location of these miles of congestion is graphically illustrated in Figure 9-2 which reflects current congestion on the freeways and state highways only during the AM peak period. Major north south corridors which are experiencing congestion include the San Diego Freeway Corridor in Los Angeles as well as Orange County, with the heaviest congestion occurring at the interchanges of the I-405 with State Route 101 in the San Fernando Valley and at its interchange with I-5, the Golden State Freeway in Orange County. Congestion is also experienced in this corridor southbound through most of Los Angeles County particularly in the Sepulveda Pass, and northbound between the Newport Freeway, State Route 55 and I-5 in Orange County. The Golden State Freeway corridor experiences its greatest congestion at the interchange with the I-405 as mentioned above as well as its interchange with the San Bernardino/Santa Monica Freeway (I-10), the

Table 9-12

1984 MILES OF CONGESTION ON ALL FACILITIES
BY VOLUME TO CAPACITY RATIOS

	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Region
V/C Ratio						
AM Peak						
< .75	7,293	1,788	1,787	1,739	1,341	13,948
.75 < 1.0	681	206	44	43	33	1,006
1.0 < 1.25	282	89	6	7	9	393
≥ 1.25	40	18	--	1	--	59
PM Peak						
< .75	6,426	1,482	1,735	1,702	1,308	12,653
.75 < 1.0	1,271	419	85	83	40	1,898
1.0 < 1.25	519	178	16	4	35	752
≤ 1.25	80	22	1	2	--	104

Source: UROAD 17:38 & 17:40 12/10/86 of RTP 86 YR 1984 AM & PM Peak
UROAD Assignments.

Pasadena Freeway (State Route 110), and with the Ventura Freeway (State Route 134). The Pasadena/Harbor freeway operates under severe congestion southbound from Pasadena to the north, and northbound from south-central Los Angeles both into the Los Angeles central business district.

East west corridors which experience morning peak period congestion at Level of Service F include State Route 101 east bound from Topanga Canyon into the Los Angeles central business district; the Artesia Freeway (State Route 91) westbound from the Riverside County Line until it reaches the Harbor Freeway; and the Pomona and San Bernardino Freeways, westbound beginning just east of the 605 Freeway and continuing into downtown Los Angeles.

2010 Travel Characteristics and Transportation Impacts of the Baseline
Projection and SCAG-82M

Future transportation system needs will depend in large part on the increase in growth, both in population and in employment that will occur between now and the year 2010. For the purpose of this analysis, we have considered future travel demand based upon two different growth scenarios

FIGURE 9-2

Figure 9-2
AM PEAK VOLUME TO CAPACITY RATIOS
ON STATE HIGHWAYS IN 1984
EXISTING NETWORK
EXISTING POPULATION AND EMPLOYMENT



LEGEND

VOLUME / CAPACITY RATIO



< 0.75



0.75 - 1.00



1.00 - 1.25



> 1.25

for the year 2010, the adopted SCAG-82M Forecast and the Baseline Projection. The following pages identify the impacts of the two growth scenarios on the Existing Plus Funded transportation system.

The limited additions and improvements to the transportation system anticipated in the Existing Plus Funded Network are not substantial enough to meet the current needs. The Existing Plus Funded System is also insufficient to serve future needs for 2010 which would result from either the forecasted or projected growth scenarios.

Vehicle Miles Traveled. The region will experience significant increases in the amount of miles traveled during the average weekday. There may be an estimated increase of 83.1 million miles of travel or a 37.5 percent increase over 1984 mileage if SCAG-82M is achieved, increasing daily VMT in the year 2010 to 304.4 million miles. Daily VMT would increase even more dramatically, 74 percent above current levels if the Baseline Projection is realized. Total VMT would increase by 163.5 million over 1984 levels, to 384.8 million vehicle miles traveled per day. Tables 9-13 and 9-14 show the most dramatic increases in morning, evening and daily mileage in Riverside County, which could double from 1984 (see Table 9-8) to 2010 under the lower growth forecast, and could triple between the 1984 and 2010 under the Baseline Projection. San Bernardino County would also experience dramatic increases in VMT, nearly doubling under SCAG-82M and increasing 138 percent as a result of the higher Baseline Projection. The majority of the vehicle miles traveled, however, would still occur on the freeways, highways and streets within Los Angeles County.

Table 9-13

2010 VEHICLE MILES TRAVELED UNDER SCAG-82M GROWTH PROJECTION AND
(PERCENT OF TOTAL VEHICLE MILES TRAVELED¹)
EXISTING PLUS FUNDED SYSTEM
Daily, Morning- and Evening-Peak Periods
(in millions and percent)

	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Region
AM-Peak	22.2 (7.31)	8.3 (2.73)	3.0 (0.99)	3.4 (1.11)	1.9 (0.63)	38.8 (12.76)
PM-Peak	46.4 (15.26)	16.7 (5.50)	6.9 (2.25)	7.6 (2.50)	4.4 (1.45)	82.0 (26.95)
Daily	172.4 (56.64)	62.0 (20.38)	25.9 (8.52)	27.8 (9.15)	16.2 (5.32)	304.4

1. Total Daily VMT for Region Estimated at 304,379,364.

Source: 2010 Existing Plus Funded/SCAG-82M UROAD 12:11:86.

Table 9-14

2010 VEHICLE MILES TRAVELED UNDER BASELINE PROJECTION and
 (Percent of Total Vehicle Miles Traveled)¹
 Existing Plus Funded System
 Daily, Morning- and Evening Peak Periods
 (in millions and percent)

	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Region
AM-Peak	28.5 (7.42)	10.8 (2.79)	5.0 (1.30)	5.1 (1.33)	2.1 (0.54)	51.5 (13.38)
PM-Peak	58.4 (15.18)	21.6 (5.61)	10.3 (2.69)	10.7 (2.78)	4.8 (1.24)	105.8 (27.51)
Daily	212.7 (55.27)	79.9 (20.78)	38.7 (10.06)	36.2 (9.40)	17.3 (4.49)	384.8

1. Total Daily VMT for the region estimated at 384,758,103.

Source: 2010 Existing Plus Funded-Baseline UROAD 12:11:86.

Freeways will accommodate a little more than 53 percent of all the daily regional ground travel, a slight 2 percent increase over their current share, which is consistent with slight increases in travel times observed at the start of the chapter and the small increase in freeway facilities between the base year and existing plus funded networks. If travel times had increased significantly, it could be a result of increased congestion on freeways. Freeway mileage in the region under the Baseline Projection could increase by 81 percent over the 1984 regional freeway mileage, increasing from 113.1 million miles daily to 205.2 million daily miles. This is consistent with the 74 percent increase in total daily VMT predicted for the region under the same growth projection. The doubling of VMT experienced by Riverside and San Bernardino Counties is reflected equally on the three facility types, freeways, arterials and secondaries.

Transit Usage. The major difference between the 1984 and the 2010 networks, the addition of the two light rail lines, Los Angeles/Long Beach line and the Century Freeway line is reflected in the changes in ridership for rail, Express bus and RTD local service (Table 9-15 and 9-16). Rail would account for seven percent of the total trips and an estimated eleven percent of the passenger miles traveled under the SCAG-82M growth forecast in 2010. The light rail lines may account for somewhat less under the Baseline Projection, six percent of the total trips or boardings and ten percent of the passenger miles traveled.

The impact of the two light rail systems on future 2010 transit usage is immediately seen in the decreasing numbers of passenger trips and miles estimated for SCRTD's local lines and the region's express service (see

Table 9-15

2010 HOME-TO-WORK TRANSIT USAGE SUMMARY UNDER SCAG-82M FORECAST
Existing Plus Funded Network

Mode	Trips (1000)	Passenger Miles (1000)	Hours (1000)	Average Miles ¹	PSGR-MI/ RT-Mile ²	Trips/ V-Mile ²
RTD LOCAL	473	1,066	82	2.25	179.58	30.75
EXPRESS	227	1,813	77	7.99	473.38	27.01
OTHER LOCAL	83	236	17	2.84	87.39	15.20
OCTD LOCAL	64	293	19	4.55	122.19	17.07
RAIL	60	420	14	6.97	5,538.02	79.41
TOTAL	907	3,829	209	4.22	256.26	26.88

1.

Boardings or unlinked trips, includes all transfers.

2.

See Table 9-5 for route miles and vehicle miles in the Existing Plus Funded System.

Source: ULOAD 4/25/86 RTP86 YR 2010 Home-Work Transit Assignment.

Table 9-16

2010 TRANSIT USAGE SUMMARY UNDER BASELINE PROJECTION
EXISTING PLUS FUNDED NETWORK

Mode	Trips ¹ (1000)	Passenger Miles (1000)	Hours (1000)	Average Miles	PSGR-MI/ RT-Mile ²	Trips/ Veh-Mi ²
RTD LOCAL	470	1,072	82	2.28	180.60	30.60
EXPRESS	257	2,256	93	8.78	549.14	30.57
OTHER LOCAL	86	156	18	2.97	95.04	15.85
OCTD LOCAL	73	337	22	4.64	140.45	19.25
RAIL	61	428	14	7.05	5,632.78	80.05
TOTAL	947	4,349	230	4.59	291.21	28.06

1.

Boardings or unlinked trips, includes all transfers.

2.

See Table 9-5 for route miles and vehicle miles in the existing Plus Funded System.

Source: ULOAD 11/25/86 YR 2010 Baseline Home-Work Transit Assignment

Table 9-6 for the 1984 summary). The number of boardings on the local lines may drop by 11,000 or 14,000 under the two growth scenarios. The number of passenger trips per vehicle mile for these local lines however, virtually doubles between 1984 and 2010 under both future growth forecasts. This may reflect increased efficiencies in service, but there is a need for more refined route analysis to determine the relationship of these local route ridership rate improvements to the light rail lines. Express bus service also reflects a drop in the numbers of passenger trips and passenger miles when analyzed under either growth scenario. Increases in the OCTD and other local line passenger transit characteristics are consistent with the increase in trip making resulting from increased growth.

Travel Times, Speeds and Delay. Increases in vehicle miles traveled in the region described earlier will lead to an increase in the daily hours of travel. The adopted forecast (SCAG-82M) will result in an additional 3.38 million hours of travel daily, or a 53 percent increase over current hours of travel. Table 9-17 describes the hours of travel for each county and the region which could be expected under the SCAG-82M growth scenario on the Existing Plus Funded system. Evening peak period hours of travel for all counties continue to exceed the hours traveled during the AM peak period. Los Angeles and Orange counties still contribute the majority of the travel time, however their share of the total hours of travel drops to 79 percent of the total hours under SCAG-82M and drops even lower, to 71 percent under the Baseline Projection. In 1984, 85 percent of the total daily hours of travel occurred in Los Angeles and Orange Counties.

Table 9-17

2010 HOURS OF TRAVEL AS A RESULT OF SCAG-82M
DAILY, MORNING AND EVENING PEAK PERIODS
THE EXISTING PLUS FUNDED NETWORK

	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Region
AM PEAK	779,219	425,245	85,540	125,434	67,754	1,483,193
PM PEAK	1,778,219	889,826	216,926	275,855	155,146	3,335,903
DAILY	5,299,439	2,351,422	764,964	827,111	482,847	9,725,783

Source: UROAD 17:21 11/12/86 Summary of YR 2010 SCAG-82M E\$F VMT,VHT and Delay by County and Region.

The largest increase in actual daily hours of travel, when comparing the 1984 hours of travel (Table 9-10) to the hours forecast under SCAG-82M (Table 9-17), is experienced by Orange County which will see an additional 1.54 million hours of travel. Riverside County would experience the greatest percentage increase in daily hours of travel, an increase of 153 percent over the 1984 hours of travel or approximately 462,300 additional hours. San Bernardino County will also anticipate dramatic increases in

daily travel time, an increase of 115 percent or 443,000 additional hours of travel. Los Angeles County, while experiencing the smallest percentage increase in daily miles will see an addition 1.1 million hours of daily travel. Orange, San Bernardino and Ventura Counties will see the greatest percentage increase in hours of travel during the AM peak, while Los Angeles and Riverside counties will experience the greatest percentage increase during the PM peak. The region would experience a 57 percent increase in AM peak hours of travel, an increase of more than half a million hours, and a 64 percent increase in PM peak hours of travel, or an increase of 1.3 million hours under SCAG-82M. Table 9-10 details the daily hours of travel for AM and PM peak periods by county.

Travel speeds on the transportation system are estimated to decrease from the 1984 average daily speed of 35 miles per hour by about four miles per hour to 31 in SCAG-82M, while average daily speeds in the Baseline Projection is predicted to drop as low as 19 miles per hour. The increase in trip making which may result from the higher growth projection is not compensated for in the Existing Plus Funded System option as very little additional construction is included.

The Baseline Projection would see even more dramatic increases in travel time over the 1984 base year's modeled hours of travel. Table 9-18 details the number of hours traveled in each county during the morning and evening peak periods and on a daily basis. Daily, the region would experience a 225 percent increase in hours of travel over the number of hours experienced in 1984 (Table 9-10), an increase of nearly 14.3 million hours. The greatest percentage increase in hours of travel for the region occurs during the morning peak period, which could increase by 378 percent or 3.6 million hours. The evening peak however would see an increase of 5.7 million hours of travel daily, more than 280 percent higher than evening peak hours of travel under the base year assumptions. Riverside County would experience the most dramatic increase in hours of travel for all three time periods. Morning peak hours of travel increase by 1358 percent (529,000 additional hours), evening hours by 809 percent (700,000 additional hours), and daily hours by 1019 percent, (3.1 million additional hours).

Hours of Delay. One of the most significant impacts of the Baseline Projection on the transportation system is the increase in hours of delay experienced by motorists daily and during the AM and PM peak periods. Figure 9-3 graphically displays the increased amount of travel time which is predicted to be spent in delay under the Baseline Projection and SCAG-82M over today's travel time and delay. The ratio of delay to travel time increases under each growth forecast, an increasing percent of the total hours of travel is spent in delay. SCAG-82M (see Table 9-19) will result in a 227 percent increase in the hours of delay over current levels. The delay anticipated as a result of the Baseline Projection (Table 9-20) will be 1640 percent higher than the 1984 levels. This means that roughly 50 percent of the region's travel time will be spent in delay under the higher growth projection. This is a dramatic change over current levels, when 10 percent of the daily travel time is spent in delay.

Table 9-18

YEAR 2010 HOURS OF TRAVEL AS A RESULT OF BASELINE PROJECTION
THE EXISTING PLUS FUNDED NETWORK
DAILY, MORNING AND EVENING PEAK PERIODS

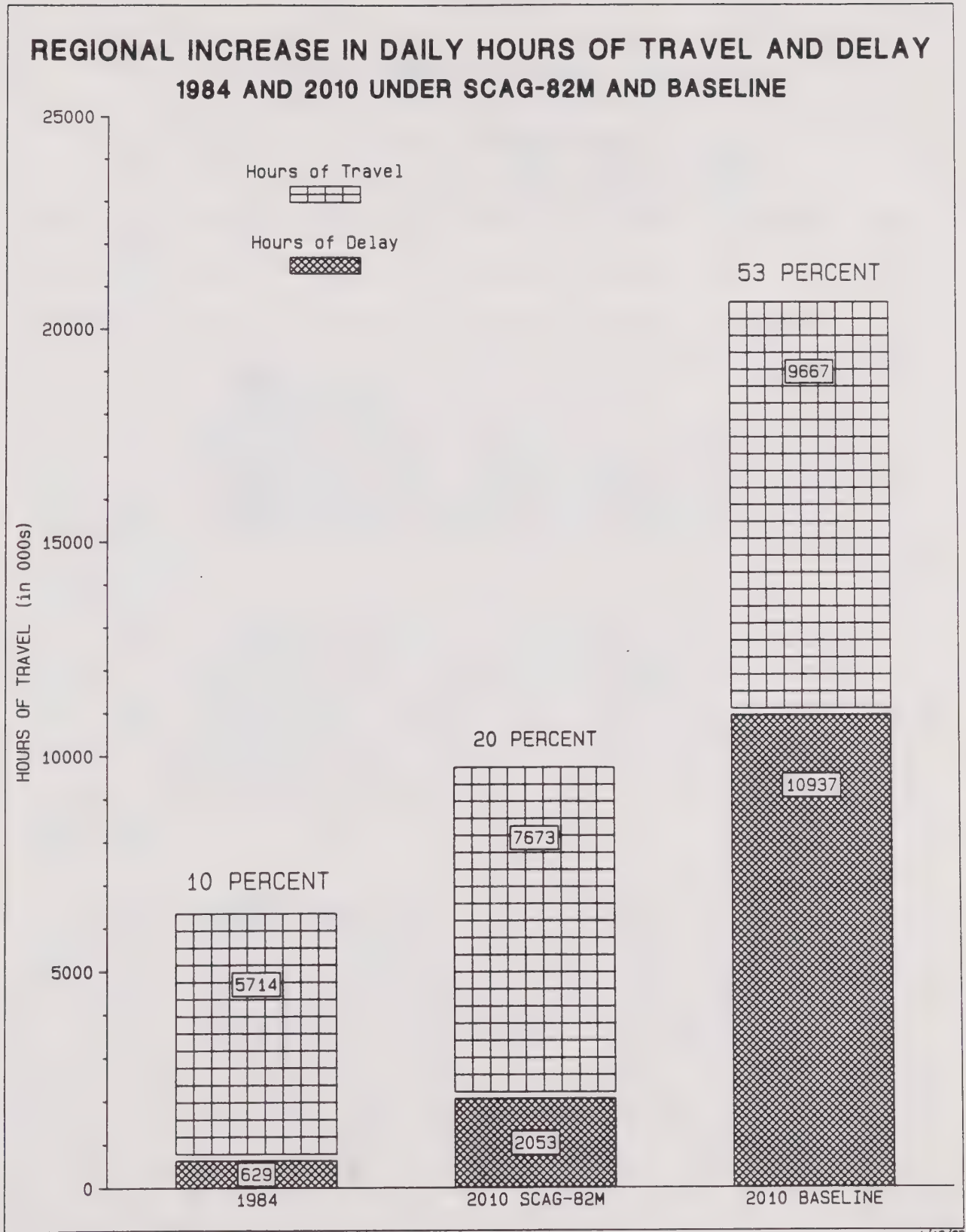
	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Region
AM PEAK	2,097,993	1,252,664	567,814	482,357	103,096	4,512,925
PM PEAK	3,695,149	2,201,628	786,589	874,574	203,367	7,761,307
DAILY	9,407,177	5,318,946	3,386,654	1,903,828	587,576	20,604,181
<u>Source:</u>	UROAD 12/10/86 SUMMARY OF YR 2010 BASELINE AM & PM PEAK UROAD ASSIGNMENTS					

Table 9-19

YEAR 2010 HOURS OF DELAY AS A RESULT OF SCAG-82M FORECAST
FOR DAILY, MORNING AND EVENING PEAK PERIODS
THE EXISTING PLUS FUNDED NETWORK

	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Region
AM PEAK	194,432	200,693	16,369	39,847	18,235	469,577
PM PEAK	544,967	438,869	59,787	83,238	155,146	1,166,885
DAILY	889,267	757,942	189,658	138,764	77,142	2,052,801
<u>Source:</u>	UROAD 17:21 11/12/86 SUMMARY OF YR 2010 SCAG-82M E\$F VMT, VMT AND DELAY BY COUNTY					

Figure 9-3



1/13/87

Table 9-20

YEAR 2010 HOURS OF DELAY AS A RESULT OF THE BASELINE PROJECTION
FOR DAILY, MORNING & EVENING PEAK PERIODS
The Existing Plus Funded Network

	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Region
AM PEAK	1,328,189	958,747	459,853	349,144	48,601	3,144,535
PM PEAK	2,101,296	1,598,242	544,364	595,823	77,983	4,917,707
DAILY	3,970,518	3,274,056	2,530,323	1,007,116	154,887	10,936,901

Source: UROAD.

At the county level, the greatest increases in delay for most counties occurs during the morning peak period. The difference in predicted increase in delay between SCAG-82M and the Baseline Projection is four or five times as much delay. San Bernardino County experiences the greatest increase, 13,970 percent or almost 14 times more than now under SCAG-82M. The Baseline Projection for delay in Riverside County is predicted to increase by 18,981 percent or 19 times greater delay. Nearly 80 percent of the AM Peak hours of travel in Riverside County will be in delay. Orange County will experience tremendous increase in the PM Peak delay, 16 times the hours of delay experienced today as predicted by Baseline Projection. This means that 94 percent of the evening hours of travel will be delayed travel time. The dramatic increases occur for all counties and for all time periods detailed in the two tables. The magnitude of this delay is a key indicator of the Existing Plus Funded network's ability to provide mobility to the increased population predicted by the Baseline Projection. A key question in the development of both SCAG-87 and the Regional Transportation Plan is what will the balance be between growth, transportation facilities and reduced mobility.

Miles of Congestion. Figure 9-4 shows the increase in morning peak period miles of congestion. The change in those miles of road which will operate at Level of Service F is a 215 percent increase between 1984 and 2010 under the Baseline Projection. During the PM Peak, even more miles are expected to operate at unacceptable levels of service; 30 percent of the road in the region are predicted to operate at Level of Service 1.0 or greater. Figures 9-5 and 9-6 are maps showing where the greatest congestion will be experienced on the region's freeways and state highways during the morning peak period. To complete the picture of congestion, Tables 9-21 and 9-22 indicate the number of miles of all facilities which are predicted to operate at a Level of Service F. The region will have 2,698 more miles of roadways operating at or above a volume to capacity ratio of 1.00 than are operating at this level in 1984. Seventeen percent of the region's road network is predicted to operate at Level of Service F during the AM Peak period under the Baseline Projection.

FIGURE 9-4

REGION'S MILES OF CONGESTION 1984 AND 2010 UNDER SCAG-82M AND BASELINE

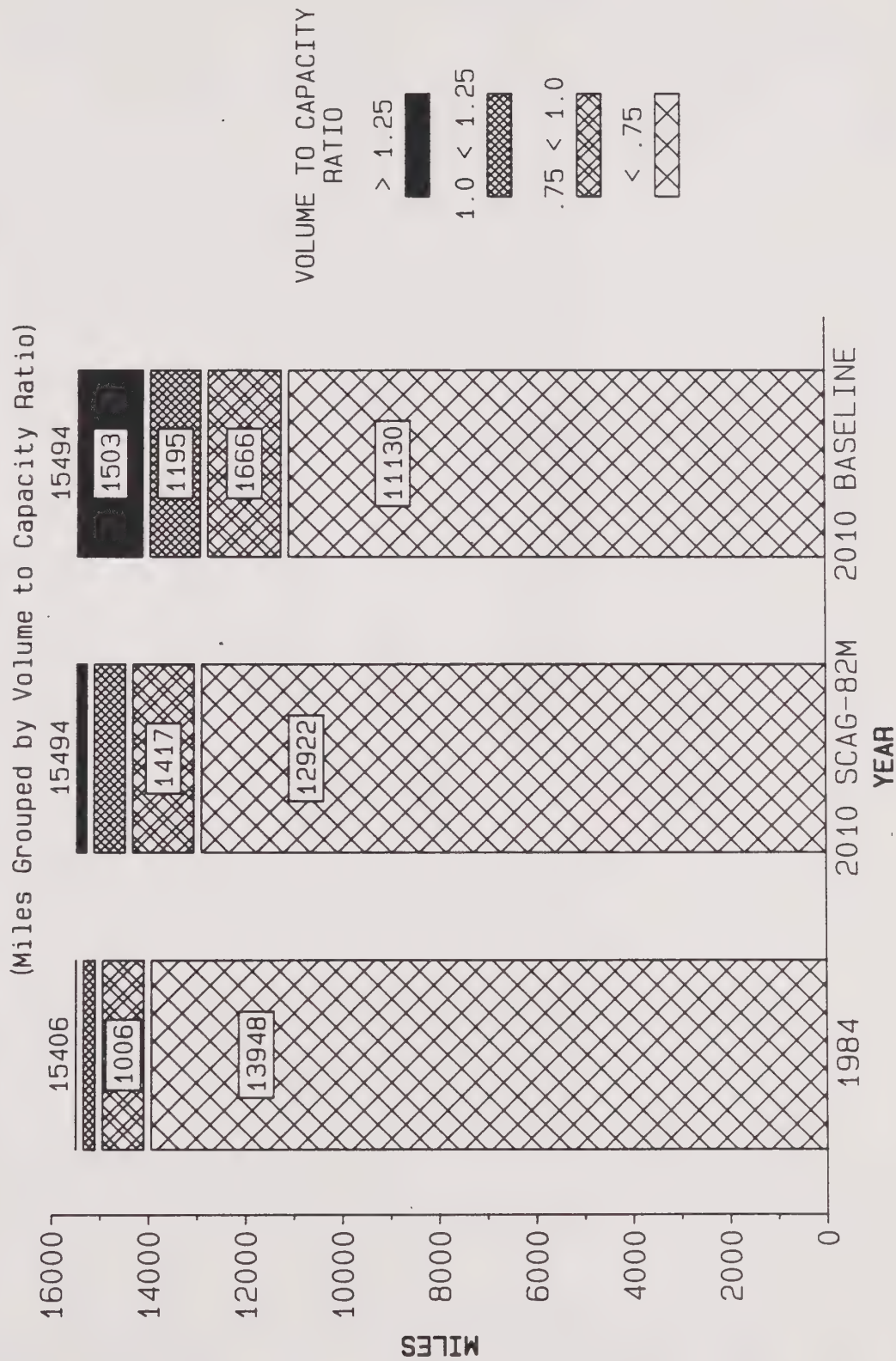
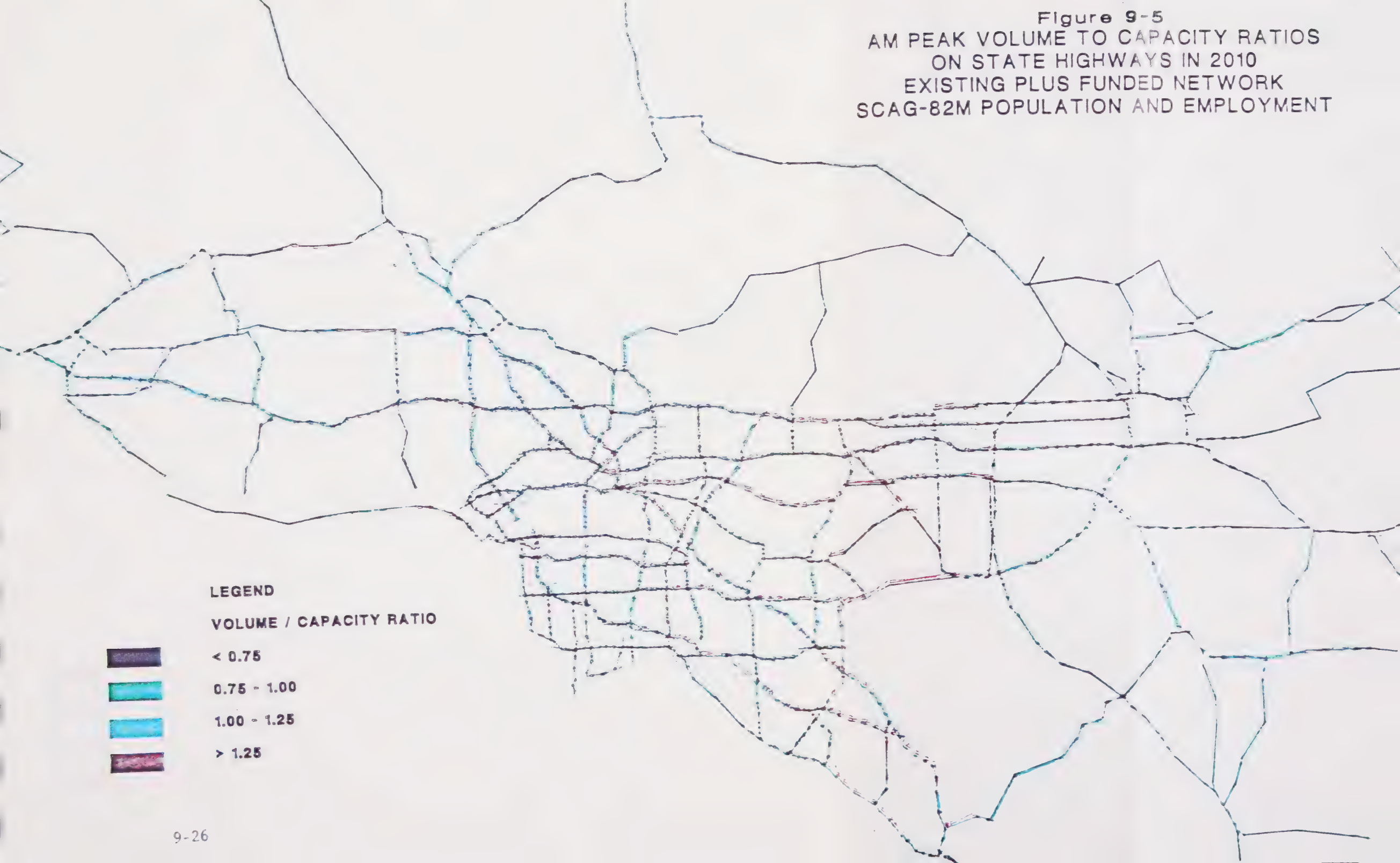


FIGURE 9-5

FIGURE 9-6

Figure 9-5
AM PEAK VOLUME TO CAPACITY RATIOS
ON STATE HIGHWAYS IN 2010
EXISTING PLUS FUNDED NETWORK
SCAG-82M POPULATION AND EMPLOYMENT



LEGEND

VOLUME / CAPACITY RATIO



< 0.75

0.75 - 1.00

1.00 - 1.25

> 1.25

Figure 9-5
AM PEAK VOLUME TO CAPACITY RATIOS
ON STATE HIGHWAYS IN 2010
EXISTING PLUS FUNDED NETWORK
SCAG-82M POPULATION AND EMPLOYMENT



LEGEND
VOLUME / CAPACITY RATIO

< 0.75
0.75 - 1.00
1.00 - 1.25
> 1.25

Figure 9-6
AM PEAK VOLUME TO CAPACITY RATIOS
ON STATE HIGHWAYS IN 2010
EXISTING PLUS FUNDED NETWORK
BASELINE POPULATION AND EMPLOYMENT



LEGEND

VOLUME / CAPACITY RATIO

< 0.75

0.75 - 1.00

1.00 - 1.25

> 1.25

Table 9-21

2010 MILES OF CONGESTION BY COUNTY
SCAG-82M on the EXISTING PLUS FUNDED NETWORK
(in miles)

Volume to Capacity	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Region
AM PEAK						
< .75	7,027	1,420	1,604	1,598	1,273	12,922
.75 < 1.00	754	325	140	132	67	1,417
1.00 < 1.25	426	202	94	49	27	798
> 1.25	133	166	19	24	15	357
PM PEAK						
< .75	5,791	870	1,294	1,386	1,170	10,512
.75 < 1.00	1,434	570	302	250	115	2,671
1.00 < 1.25	843	380	178	103	72	1,575
> 1.25	271	293	83	64	26	736

Source: UROAD 17:14 12/10/86 Summary YR 2010 SCAG-82M E\$F AM Peak and PM Peak UROAD Assignment by County.

Table 9-22

2010 MILES OF CONGESTION BY COUNTY FOR AM & PM PEAK
BASELINE on the EXISTING PLUS FUNDED NETWORK
(in miles)

Volume to Capacity	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Region
AM PEAK						
< .75	6,140	1,103	1,250	1,384	1,254	11,131
.75 < 1.00	890	397	194	113	72	1,666
1.00 < 1.25	642	257	139	119	39	1,195
> 1.25	668	356	273	187	18	1,503
PM PEAK						
< .75	4,404	446	880	1,036	1,120	7,886
.75 < 1.00	1,760	419	269	292	132	2,871
1.00 < 1.25	1,213	523	289	230	88	2,343
> 1.25	961	726	418	245	43	2,393

Source: UROAD 12/10/86 Summaries of Baseline AM and PM Peak Uroad Assignment by County.

Riverside and San Bernardino Counties again will see the greatest increase in congestion during peak commute periods. Under the Baseline Projection, 22 percent of Riverside County's roads during the AM peak, and 38 percent of the roads during the PM peak will operate at Level of Service F. This is 220 times more miles of congestion than the county presently experiences. Los Angeles County is predicted to have high levels of congestion on 16 percent of the roads during the AM Peak and 26 percent of the roads during the PM Peak. All of the counties will experience these dramatic increases.

Capacity deficiencies on the Existing Plus Funded network as predicted by the Baseline Projection (Figure 9-6) show high levels of congestion on all major interstate freeways east of and including Interstate 5 in the AM Peak direction. Interstate 5, between its interchange with the State Route 55 and the Los Angeles CBD is predicted to have volume to capacity ratios in excess of 1.00 in both directions during the AM Peak. The figures indicate that even those areas where additional facilities are anticipated on the Existing Plus Funded network, morning peak direction traffic volumes will exceed capacity under either SCAG-82M or the Baseline Projection. This is noticeable on the Century Freeway which is predicted to operate within the range of V/C ratios of 1.00 and 1.25. in the eastbound direction. Interstate 405, also experiences similar two directional volume to capacity deficiencies between State Route 55 and Interstate 605.

Lane Needs Today and in the Future

Lane-Mile Deficiencies. Facilities which are currently operating or which are predicted to operate at Level of Service F are facilities which need more capacity. How much more capacity is referred to as lane-mile deficiencies, and can be measured for all facilities or for each facility type. The need for additional lanes of roadway is greater during the evening peak than in the morning peak period. Table 9-23 indicates total lane-mile needs for the region and for each county for each of three years analyzed.

Current needs, to solve today's morning congestion problems total 221 lane-miles, of which 136 lane-miles are freeways, a 2 percent increase over the region's current freeway lane-miles (Table 9-24). The PM peak has needs nearly double that of the morning, 422 lane-miles needed of which 231 are freeways.

The Baseline Projection would result in far greater lane-mile needs for both the morning and evening peak periods. The AM Peak needs include 1284 additional lane-miles of freeways, 2565 additional lane-miles of arterials and 332 lane-miles of secondary roads, a total of 4181 additional lane-miles. This equals a 17 percent increase in freeway lane-miles needed in the region to handle morning commute trips. Orange County will see the greatest need for freeways, an additional 38 percent, while Los Angeles and Riverside Counties will need 15 percent more freeways than they would have under the Existing Plus Funded Network. The PM Peak period would need nearly 6000 additional lane-miles to serve the predicted congestion. There would be a need for 27 percent more freeways, an additional 1968 freeway

Table 9-23
COUNTY AND REGIONAL LANE-MILE NEEDS
1984 BASE YEAR AND 2010 UNDER SCAG-82M AND BASELINE PROJECTION
(in Lane-Miles)

	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Region
AM PEAK						
1984	162	55	2	2	1	221
2010						
SCAG-82M	388	414	41	69	30	942
2010						
BASELINE	1880	1130	589	529	53	4181
PM PEAK						
1984	314	98	3	2	5	422
2010						
SCAG-82M	761	682	116	119	54	1733
2010						
BASELINE	2599	1919	742	651	86	5998

Source: Lane-Mile Deficiency Analysis 1/22/87 for 1984 Base Year and Network, Existing Plus Funded Network under SCAG-82M and Baseline Projection.

Table 9-24
REGIONAL LANE-MILE DEFICIENCIES BY FACILITY TYPE
1984 BASE YEAR AND 2010 UNDER SCAG-82M AND BASELINE PROJECTION
(In Lane-Miles)

	Freeways	Arterials	Secondaries
AM PEAK			
1984	136	73	12
2010			
SCAG-82M	473	414	57
2010			
BASELINE	1284	2565	332
PM PEAK			
1984	231	158	33
2010			
SCAG-82M	862	746	125
2010			
BASELINE	1968	3537	494

Source: Regional Peak Period Lane-Mile Deficiencies, 1/22/87. For 1984 Base Year and Network and 2010 Existing Plus Funded Network Under SCAG-82M and Baseline Projection.

lane-miles, and 9 percent more arterials - 3537 additional lane-miles. Orange County will continue to need the greatest percentage increase in freeway lane miles although Los Angeles County will require the greatest amount.

The final factor of importance is the greater need for arterial roadways under the Baseline Projection than under either SCAG-82M or the Base Year. The need for arterials will exceed the need for freeways throughout the region. This reflects the fact that freeway congestion will be so severe that a trip will actually take the same time on the arterials that it takes on the freeways.

AVIATION

Airport Capacity

While the transportation system must meet the needs of travel within the region, it must also provide for travel to and from other regions in the state, nation, and around the world. This inter-regional travel is accommodated on the region's freeways, airports, and passenger lines. This section examines the effects of the Baseline Projection on the airport system for both passenger and cargo needs.

Implication of Baseline Projection on the Regional Airport System

The regional airport system consists of 56 public use and military airports. The SCAG region is the densest air traffic region in the United States in terms of airports and aircraft operations. Based on SCAG-82M, there will be a 30% shortfall in airport capacity by the year 2000. The increase in the population called for by 2010 under the Baseline Projection will further aggravate this situation.

While a detailed analysis of air passenger forecasts under the Baseline Projection is still being done, some possible implications can be developed based upon past growth rates. In 1984, passenger activity stood at 44.7 million annual passengers (MAP) in the region. Based upon the actual annual growth rate of 3.08 percent in passenger activity during the years 1970-1980, a probable scenario for the year 2010 shows a total of 104 MAP. A high growth scenario, based on the years 1980-1985 with a 3.9 percent annual rate of increase in passenger activity, corresponds to a total of 129 MAP by the year 2010, an increase of 84.3 MAP from 1984 to 2010. In addition to the shortfall in airport capacity, SCAG-82M predicts 57 miles of ground access congestion, level of service E or worse, in the vicinity of existing airports. Under the Baseline Projection, the congested conditions will increase.

Baseline Projections predict most of the growth will occur in the eastern part of the SCAG region. Demand on Ontario Airport will increase with these new projections. The Baseline Projection predictions underscore the importance of implementing the Ontario ground access improvements already planned.

While most of the growth will take place in the eastern part of the region, most of the infrastructure exists in Los Angeles County. This makes it easier to get to LAX, Long Beach Airport, and Burbank Airport. This puts a heavy demand for services at these facilities and causes further congestion and delay. Reduced ground access speeds in the San Fernando Valley and elsewhere should increase the attractiveness of Palmdale for air services.

There has been an enormous increase in all-cargo flights over the past few years, particularly at Ontario Airport. Eventually, this growth will reduce capacity of existing airports to serve air passengers. This suggests a need to provide alternatives for air cargo movements, either through air cargo reliever airports like Palmdale, or by joint-use of military airbases for commercial air cargo.

Based on previous regional studies, there will be an airport capacity shortfall beyond the turn of the century even if we relax policy constraints at all existing airports and build a new airport or convert a military facility. It has become very difficult to place a large, new air-carrier airport in the urbanized part of the region. The environmental and airspace impacts of a 20 to 25 million annual passenger (MAP) facility are too enormous to be accommodated. This suggests that new airports along the urban fringe should be planned at a smaller scale in the range of 4 to 8 MAP, and that the closer the airport is to the urban core, the smaller it should be. The exception to this may be the conversion of a military airbase to civilian use where land use and airspace have been protected.

Ports

The most recent forecasts on port tonnage for the year 2020 indicate a 223 million ton throughput for the combined Ports of Long Beach and Los Angeles. Current estimates of port imports and exports indicate that approximately 65 percent of the tonnage flowing through the ports was destined for or originated in California. Assuming that 60 percent of the total traffic has an origin or destination in Southern California, about 60 million of the 100 million tons of current throughput can be considered locally generated Cargo. This 60 million tons would be impacted by the Baseline Projection. Preliminary evaluations of a projected change in tonnage due to an increase in population of 5.9 million indicate an increase of approximately 24.9 million tons. This represents a 41 percent increase in local tonnage, about half of which would be petroleum moving via pipelines to local refineries.

It is assumed that the other half of the local cargo would be moved by truck. The resulting tonnage would produce 4,148 additional truck trips per day. The congestion generated from this additional traffic would be above that already predicted for the ground transportation in the vicinity of port areas.

Summation

Ground Transportation. This analysis of transportation impacts of the Baseline Projection paints a gloomy picture of the road and networks' ability to provide for mobility. Certainly this analysis can be viewed as a worst case scenario. The limited additions and improvements to the transportation system anticipated in the Existing Plus Funded Network, are not substantial enough to meet the current needs. This network is also insufficient to serve future needs. The next question to be answered in the transportation arena is how much of the transportation impacts of the Baseline Projection can be mitigated through facility construction, through demand management and through system management, and how much of the impact cannot be mitigated?

Ports and Airports. The increases in passengers and cargo and the region's port and airport facilities are equally dramatic. The predicted congestion on ground transportation alone will impact these facilities, while their increased activity will add to already congested areas.

The development of a SCAG-88 Forecast is dependent, in part, on the degree of transportation impact mitigation which can be expected from the Regional Transportation Plan (RTP). The development of a new RTP relies on the evaluation of different road and transit networks in an effort to identify those facilities which if constructed, would achieve the greatest improvement in mobility. Through this evaluation we can assess the degree to which the Baseline Projection impacts may be mitigated.

WATER SUPPLY

Projections of water supply and demand in the SCAG region are influenced by a large number of factors. Increases in urban water demand resulting from the Baseline Projection population levels, in conjunction with slight declines in agricultural water demand, would result in a net increase in water use in the region of about 12% between 1984 and 2010. While overall water demand is projected to increase, dependable supplies are expected to decline, from about 7.48 million acre-feet (MAF)⁸ in 1984 to about 6.72 MAF in year 2010. This combination of increased demand along with declining supplies, could result in a regional dry year shortfall of approximately 1.20 MAF of water by 2010.

Although total water demand levels would not increase at a rate equivalent to projected population growth, the increase is nonetheless significant in light of the many constraints which impact both the local and imported water supplies utilized in the region. Several options for increasing dependable yields from these resources are currently being pursued and may result in the availability of additional supplies to the region by 2010. These and other issues that impact the region's future water supplies and demands are discussed in the following sections. The sources for this assessment are listed at the bottom of the page.

Water Supply

Local Supplies--Local surface and ground waters provide about one-third of the region's water supply. This local water supply includes water pumped from groundwater basins and diverted from surface waters. Major groundwater basins in the region include the Central, Raymond, San Fernando and San Gabriel Basins in Los Angeles County, the Upper Santa Ana Valley Basin system in San Bernardino and Riverside Counties, the Orange County Coastal Plain Basin, the Coachella Valley Basin in Riverside County, and the Oxnard Plain Basin in Ventura County. The largest surface water sources in the region are the Colorado River, and the Santa Ana and Santa Clara River systems.

Sources: DWR, The California Water Plan, Projected Use and Available Water Supplies to 2010, December 1983.

DWR, State Water Project Service Area Impact Study, May 1985.

MWD, 1982 Population and Water Demand Study, December 1982.

SCAG, Infrastructure Capacity Analysis-Water Supply Component, January 1986.

8. One acre-foot of water is equal to approximately 325,900 gallons. It is generally estimated that a family of four utilizes about one acre-foot of water annually.

Local water resources are fully developed and are expected to remain relatively stable into the future. However, several issues may impact the quantity and quality of water available from these sources.

By 2010, local water supplies may be reduced in some areas, while in other areas they may increase. Several groundwater basins around the region are threatened by overdraft, by increasing levels of salinity, and by toxic pollutant contamination. Reductions in local supplies may also occur as a result of the conversion of agricultural land to urban development and the commensurate reduction in land surface available for groundwater recharge. Also, groundwaters with high levels of salinity that may currently be used for irrigation might not be suitable for domestic consumption unless the quality is improved by demineralization.

The increased use of reclaimed wastewater is expected to be an important local water resource in the future. It is the largest undeveloped local water resource available to offset future deficits in supply. Reclamation is currently taking place in various areas around the region, but the expansion of its use is limited by a number of factors such as lack of distribution capacity, costs, health concerns and liability issues. Local groundwater supplies may also be increased if projects designed to desalinize currently degraded basins are implemented.

Imported Supplies--The SCAG region depends heavily upon water which is imported to the region from other areas of the state. Approximately 64% of the region's water supply is derived from imported sources. Several major conveyance systems bring water to the urbanized portion of the region from northern California (via the State Water Project), the Sierra Nevada (via the Los Angeles Aqueducts), and from the Colorado River via the Colorado River Aqueduct. The All-American/Coachella Canals deliver agricultural irrigation water from the Colorado River to the Coachella and Imperial Valleys.

The continued availability of water from these various sources at current levels is somewhat uncertain. The resolution of issues associated with the region's imported supplies will greatly affect the quantity and dependability of water which will be available to the SCAG region in 2010. Some of the issues impacting imported water supplies are as follows:

- o Maximum entitlements held by State Water Project (SWP) contractors in the SCAG region cannot be fulfilled with facilities currently available on the SWP. Several attempts to complete major additions to the SWP have been unsuccessful and have resulted in efforts to secure other means of increasing project yields. Currently, such activities include a Coordinated Operations Agreement between the State and the U.S. Bureau of Reclamation (which could increase the firm yield of the SWP by 200,000 AFY), completion of additional pumping capability at the Delta, development of additional offstream storage facilities, and potential water transfers between agricultural and urban SWP contractors.

Currently, the firm or dependable yield⁹ from the SWP to the SCAG region is about 1.05 MAF per year.

The firm yield of the entire State Project system, based on existing facilities, is expected to decrease by 2000 as (1) water use in areas of origin (i.e. northern California) increases, (2) Federal Central Valley Project (CVP) contractual obligations increase, and (3) use of water associated with other prior rights to northern California water supplies materializes. If additional water supplies are not secured, SWP contractors will face increasing risks of water supply deficiencies during dry years. However, in years of normal or above-normal precipitation, existing SWP facilities can deliver more than the firm yield (about 60% of operational years).

- With commencement of the Central Arizona Project (CAP) in 1985, the dependable supply of Colorado River water to California is limited to 4.4 MAF per year. (It is estimated that Arizona will not make full use of its entitlement until about 1993.) In reducing California's apportionment, the dependable supply allocated to the Metropolitan Water District (MWD), has been reduced from 1.212 MAF to .55 MAF per year. However, several short-and long-term strategies for enhancing dependable supplies of water from the Colorado may be available to MWD. They include surplus water use, predelivery of exchange water, unused apportionments by other states, unused entitlements by agricultural agencies, salvage of agricultural water losses, and banking of Colorado River and State Project water.

California agricultural agencies (i.e. Imperial Irrigation District, Palo Verde Irrigation District and the Coachella Valley Water District), hold priority to the first 3.85 MAF of California's basic apportionment (4.4 MAF) of Colorado River water. Strategies for transferring the use of a portion of these supplies from agricultural to urban uses are currently being investigated by MWD.

- Litigation and legislation aimed at reducing the diversion of water from the Mono Basin and reducing groundwater pumping in the Owens Valley could reduce the yield of the Los Angeles Aqueducts. Currently, this system provides nearly 80% of the City's water supply, or about 470,000 AF per year.

(Supply figures stated in this section were aggregated from data in the sources mentioned on the first page of this section).

Water Demand

Water demand in year 2010 will be influenced by several factors, including projected population growth, marketplace competition for agricultural

-
9. Firm or dependable yield is the annual supply of a given water development that is expected to be available on demand, with the understanding that lower yields will occur in accordance with a predetermined schedule or probability.

products, patterns of land use, water costs and pricing, and the impact of water conservation. Several assumptions are made in this assessment of projected water use in the region.

First, it is assumed that with expanded water conservation activities, increased housing densities, and smaller lot sizes, urban per-capita consumption rates will decline approximately 5% by 2010. (MWD, 1982 Population and Water Demand Study) It should be noted, however, that per capita use may vary significantly from year to year depending upon climatic fluctuations. In years of low rainfall and/or above-normal temperature, per capita water use may be higher. Conversely, in years of high rainfall and/or below normal temperatures, water use per capita may be lower. The projection of water demand for year 2010 assumes "average" weather conditions and "normal" levels of urban water use per capita.

Similar "average" weather conditions and consumption levels are assumed for agricultural water use. Agricultural water demand is assumed to decline slightly between 1984 and 2010, generally resulting from the conversion of agricultural lands to urban development. The potential impacts associated with changes in water pricing were not included in this assessment of future demand.

Regionally, the Baseline Projection population levels of 18.3 million persons would result in a total (both urban and agricultural) water demand of approximately 7.92 MAF per year by 2010, as shown in Table 10-1. This is a net increase in water use of about 12% over 1984 levels, and is largely driven by the projected population growth. By 2010, urban water demand would be about 3.98 MAF per year, an increase from 1984 of about 31%. Agricultural sector demand is projected to decline about 2% by 2010, utilizing about 3.94 MAF of water annually. If dependable supplies of 6.72 MAF are available to the region in 2010, a potential shortfall of 1.20 MAF per year could occur in a dry year. Lesser shortfalls would occur in normal and wet years; however, in years of severe drought, shortfalls could be much greater.

The impacts of the increased water demand resulting from the Baseline Projection would vary geographically within the SCAG region. For the purposes of further analysis, two major subareas have been distinguished and are discussed in the following sections, and summarized in Table 10-2. These subareas are: (1) the "Coastal Plain Subregion", or the more densely populated portion of the SCAG region, generally contiguous with the SCAG portion of the Metropolitan Water District service area; and (2) the "Outlying Subregion", which includes the remainder of the region.

Coastal Plain Subregion--In 1984, the population of the "Coastal Plain Subregions" was approximately 11.08 million persons, or about 89% of the SCAG region population. About 2.84 MAF of water was utilized in this area for both urban (89%) and agricultural (11%) uses. About one-third of this water was derived from local surface and groundwater supplies; the remainder was imported from the Sacramento Delta, the Colorado River and the Owens/Mono basins.

Table 10-1

ESTIMATES OF WATER SUPPLY AND DEMAND
FOR 1984 AND 2010 BASELINE POPULATION

	<u>1984</u>	<u>2010</u>
Dependable Supplies ¹	7.48	6.72
Normal Demand ²		
Urban	3.03	3.98
Agriculture	4.02	3.94
Total	7.06	7.92
Potential Surplus/Shortage	+0.42	-1.20

¹ Dependable supplies are those that would be available to the SCAG region during dry periods. Supplies would be higher during normal and wet years, but would be substantially less during a severe drought. Estimates assume that local supplies and L. A. Aqueduct supplies remain stable. Additional yields may be available to the region if various measures, such as the Coordinated Operations Agreement and other cooperative water management program are implemented. However, due to uncertainty of implementation, they are not included here.

² Demand can vary significantly from year to year due to weather and other variables.

Table 10-2

ESTIMATED OF WATER SUPPLY AND DEMAND
 BY SUBAREA -- 2010 BASELINE PROJECTION
 (in MAF)

	"Coastal Plain"	"Outlying"	Total
Demand			
Urban	3.07	.91	3.98
Agriculture	.23	3.71	3.94
Total	3.30	4.62	7.92
Dependable Supplies	2.60	4.12	6.72
Potential Shortfall	(.70)	(.50)	(1.20)

If population levels projected in the 2010 Baseline Projection are achieved, water agencies in this subregion would need to serve a population of approximately 15.28 million persons, or an increase of 4.20 million persons over 1984 levels. It is expected that agricultural water demand in this subregion would decline from 1984 levels, primarily due to the conversion of agricultural lands to urban development. Overall, it is estimated that this subregion would demand about 3.30 MAF of water for both urban (3.07 MAF) and agricultural (.23) consumption.

Expected declines in dependable yield from both the SWP and the Colorado River would result in a dependable supply to this subregion of about 2.60 MAF in 2010. Assuming that no additional cutbacks are imposed on imported supplies, that only current facilities are available, and that groundwater contamination does not significantly impact local supplies, projected levels of demand could result in an annual shortfall of about 700,000 AF per year in this subregion. Lesser shortfalls would occur in normal and wet years, however, in years of severe drought, shortfalls could be much greater.

Outlying Subregion--By the year 2010, the Baseline Projection indicates that the "Outlying Subregions" will be populated by approximately 2.98 million persons, or more than double 1984 population levels. It is estimated that with 2010 Baseline population projections, urban water demand in this subregion would be about .91 MAF annually. Agricultural water use is assumed to remain relatively stable through 2010 and would utilize approximately 3.71 MAF of water. With total water demand in this subregion projected to be about 4.62 MAF in 2010, this subregion could experience a shortfall of .49 MAF in a dry year. This shortfall could be much less or much greater, depending upon weather conditions.

Most areas of this subregion are heavily dependent upon local surface and groundwater resources as major sources of supply for both domestic and agricultural uses. Supplemental supplies are also currently available in some areas through SWP contractors. However, the largest source of water in this subregion is the Colorado River, to which the agricultural agencies (Imperial Irrigation District, Coachella Valley Water District and the Palo Verde Irrigation District) hold priority to 3.85 MAF annually.

Population growth poses particular problems in this subregion because of the reliance on groundwater basins as primary water supply sources. Past population growth and agricultural development have resulted in pumping which has greatly exceeded safe yield levels and many groundwater basins in this subregion are experiencing serious overdraft problems. The Oxnard Plain Basin (Ventura County), Antelope Valley Basin (north Los Angeles County), Mojave Basin (San Bernardino County), and the Coachella Valley Basin (Riverside County), are major supply sources that are currently experiencing significant overdraft problems.

While decreased agricultural water usage may offset some increases in domestic demands, other constraints may limit the availability of groundwater supplies to this subregion in 2010. Such potential constraints include degraded water quality resulting from increasing levels of salts

and nitrates in groundwater, and the possibility that groundwater resources currently utilized for irrigation purposes may be unsuitable for domestic consumption without treatment.

The delivery of imported water supplies from the State Project water to this subregion are constrained by the same issues facing other SWP contractors, (i.e. expected declines in firm yields with existing facilities). In addition, there is some uncertainty regarding the ability of local purveyors to develop the distribution facilities to serve potential growth in their service areas.

WASTEWATER TREATMENT¹⁰

This section addresses the impacts of population growth in the Baseline Projection on wastewater treatment capacity needs. Nearly 90% of the region's population is currently served by 109 public or municipally owned wastewater treatment plants, and there are close to 75 different jurisdictions involved in providing collection, treatment and disposal of wastewater. The remaining 10% of the region's population either relies on septic tanks, or small package treatment plants operated by private concerns.

Existing Treatment Plant Usage

The collective capacity of all treatment plants in the region is 1,660.5 million gallons per day (MGD), and the plants are collectively operating at 87% of total capacity (1,448.5 MGD) to treat their average daily flows. During peak daily or seasonal periods, the capacity used is even higher. (Because of peak demand, plants operating at 75% for average flows are often considered to be in need of expansion.)

The above regional figure on capacity use masks differences in capacity use among counties, as shown below, and also masks differences among individual wastewater districts within counties, as shown in SCAG's recent study footnoted below. Some individual districts currently have very ample treatment capacity to treat average and peak flows, while other districts are approaching or exceeding their capacities, sometimes resulting in violation of waste discharge requirements prescribed by state and federal regulations.

Percent of Countywide Wastewater Capacity Used by Average Daily Flows -- 1985*

<u>County</u>	<u>% Use</u>
Ventura	79
Los Angeles	90
Orange	90
Riverside	73
San Bernardino	73
Imperial	79
<u>Region</u>	87%

* Capacity amounts do not reflect type of treatment. A large volume of treatment in Los Angeles and Orange Counties is only given primary level and is thus below EPA standards.

10. All current data presented in this section is based on a survey of wastewater districts contained in a recent SCAG study, Infrastructure Capacity Analysis: Wastewater Component, October 1985.

Future Treatment Plant Shortfalls

A generalized assessment is provided on the following table of the impacts of population growth in the Baseline Projection on countywide treatment capacities. The table shows (1) the total existing plus funded capacity in each county; (2) projected average daily flows in each county for the year 2010; and (3) 2010 shortfalls in capacity, based on the difference between projected average flow and existing plus funded capacity.

Before discussing the results, it is important to state the assumptions and limitations of the analysis:

1. The analysis of future impacts is at the county level only. At this juncture, it is not possible to estimate capacity shortfalls at the individual wastewater district level without disaggregating the Baseline population projection into the numerous boundaries that make up the 75 different jurisdictions providing treatment. Ultimately, it would be very useful to determine population growth impacts on individual districts.

Short of that effort, a listing is provided at the end of this section (Table 11-2) showing districts currently handling average wastewater flows exceeding 75% of capacity. It is strongly cautioned not to draw conclusions about future capacity shortfalls from this listing as some of these districts already have expansion plans. Also, the degree to which capacity will be affected in the future will depend on actual amounts of growth occurring within these districts. Additionally, some districts that are not listed (because their flows are currently lower than 75% of capacity) could experience future shortfalls in capacity if they undergo very high levels of growth.

2. Treatment capacity assumed for 2010 is existing plus funded capacity, only. In reality, many districts have expansion plans that are currently unfunded, but these are excluded because of their uncertainty. Few districts, with the exception of certain major ones, have both firm plans and committed funding more than five years in the future.
3. Projected average daily flows for 2010 are figured by applying current county per capita flows (from combined residential, industrial and commercial flows) to forecast 2010 county population. It is assumed that existing per capita rates will remain constant, as will existing amounts of unsewered population (with the exception of Los Angeles County where it is assumed that 25% of the sizable unsewered population will become sewered). Clearly, projected flows would be higher than indicated on the table if per capita rates increase, and/or if more unsewered areas become sewered. There is unsewered population in nearly every county today. Most new developments are sewered; if significant growth occurs in unsewered areas, these areas may need to have sewerage.
4. The table indicates capacity shortfalls for each county, based on the difference between capacity and projected average daily flow of all

Table 11-1

ESTIMATED YEAR 2010 WASTEWATER TREATMENT CAPACITY
SHORTFALLS IN THE SCAG REGION (BASED ON BASELINE PROJECTION)

County	Existing Plus Funded Treat- ment Capacity (MGD) ¹	2010 Estimated Average Daily Flow (MGD) ²	2010 Treatment Capacity Short- Fall in MGD (and %) ³	% of Capacity Currently Used	% of Capacity (Existing + Funded) Used in 2010
Ventura	97	105	-8 (8%)	79%	108%
Los Angeles	1,122	1,254	-132 (12%)	90%	112%
Orange	348	379	-31 (9%)	90%	109%
Riverside	102	201	-99 (97%)	73%	197%
San Bernardino	144	189	-45 (31%)	73%	131%
Imperial	14	19	-5 (36%)	79%	136%
TOTAL	1,827	2,147	320 (18%)	87%	118%

¹ Includes all existing, plus funded capacity programmed for construction.
MGD = million gallons per day.

² Average daily flow derived by applying existing county per capita flow rates to projected county population (exclusive of population currently unsewered).

³ Shortfalls are based on difference between projected average daily flow and projected capacity. The shortfall is considerably higher when peak flows are considered. Treatment facilities must be sized to handle peak flows, which can be up to 25% higher than average daily flows.

plants, as stated above. This is expressed in absolute (MGD = million gallons per day) and percentage terms. Shortfalls actually would be more severe than indicated, because treatment plants must be sized larger than average flows in order to handle peak flows.

5. The county shortfall in capacity is a collective figure, and as such masks the fact that some individual districts within a county may actually have "surplus" capacity in the year 2010.
6. The capacity figures listed do not reflect type of treatment capability. If all plants complied with secondary treatment requirements per EPA standards, shortfalls would be greatly increased. For example, the Los Angeles Hyperion plant has 420 MGD of primary treatment capacity, but only 100 MGD of secondary capacity. The capacity figures examined in the analysis are the larger figures.

The analysis, as summarized in the table, indicates that the region as a whole will experience a 18% shortfall in combined wastewater treatment capacity by the year 2010, based on currently available plus funded capacity. This translates to 320 MGD of capacity, an amount equivalent to about 2.5 million people. The percent shortfalls in three counties will be considerably higher than 18%: Riverside County will experience the greatest percentage capacity shortfall (about 97%), due to the very high population growth rate of 166% projected during 1984-2010. Similarly high growth rates in San Bernardino County (128%) will cause a 31% shortfall, and in Imperial County (63%), a 36% shortfall. The other three counties will experience percent shortfalls lower than the 18% regional shortfall, either because their growth rates are lower and/or they have sizable amounts of surplus capacity to absorb growth.

In absolute terms (total MGD), Los Angeles County will experience the largest shortfall (132 MGD), followed by Riverside County (99 MGD), San Bernardino County (45 MGD), Orange (31 MGD), Ventura (8 MGD), and Imperial (5 MGD). Although Los Angeles County will experience a small percentage capacity shortfall (12%), the absolute amount of shortfall is relatively high compared to the other counties because of the large capacity systems in this highly populated county. (Note also that the shortfall in Los Angeles County would be considerably higher if it is assumed that existing primary treatment capacity must be converted to secondary treatment at the county's two largest plants (Hyperion and JWPCP). This appears likely at Hyperion; the JWPCP is still operating under a waiver from full secondary treatment.)

Funding is the critical issue facing current and future wastewater treatment capacity needs. In the past several years, there have been sharp reductions in the federal and state construction grants programs, causing greater and greater reliance on local funding sources (e.g., user fees, connection fees, special assessments, bond sales, etc.). Some districts have been able to find adequate funding to expand infrastructure, but many others have not. The consequences of potentially inadequate funding for enlarging capacity could be twofold: First, projected growth may actually be retarded or restricted in shortfall areas through moratoria imposed on

sewer hook-ups, or through increased housing costs resulting from construction costs passed onto prospective homebuyers by developers. Second, the water quality of receiving waters could be degraded in areas where flows are allowed to exceed capacity and where wastewater is inadequately treated.

Other Wastewater Management Issues

Aside from issues of adequate treatment capacity for handling future growth, there are other issues regarding wastewater management. One issue is level of treatment. As more and more wastewater effluent is generated from growth and enters receiving waters, the level of treatment becomes increasingly important for maintaining water quality. Currently, three large districts discharging to the ocean (City of L.A. Hyperion Plant, L.A. Co. Sanitation Districts Joint Water Pollution Control Plant and the Co. Sanitation Districts of Orange County) do not provide full secondary treatment, the minimum level of treatment currently required by law. Instead, these districts provide primary treatment for all flows, and secondary treatment for a portion thereof. Conversion of the facilities to provide secondary treatment for all flows will be extremely costly; the City of Los Angeles has recently agreed, because of state and EPA denials of waivers, to provide full secondary treatment at the Hyperion plant. Approximately \$2.5 billion is committed to complete this work and many other improvements, with completion date set for 1998. (SCAG, Infrastructure Capacity Analysis: Wastewater Component, 1985.)

Another issue is finding quicker solutions for the management of wastewater sludge residuals which have been banned from ocean disposal.

Still another issue is the condition and ability of wastewater collection systems to serve present and future demands. Some districts, particularly in older areas, have deteriorating collection systems needing rehabilitation or replacement. Additionally, some collection systems need enlarging; this occurs even in sewage districts where treatment plant capacity is adequate. The table at the very end of this section lists districts in the SCAG region indicating a current need to expand or rehabilitate portions of their collection systems. The information is based on the recent SCAG survey of sewage districts.

In summary, growth projected to the SCAG region under the Baseline Projection will result in at least a 18% increase in combined regional treatment capacity needs by 2010, with even greater capacity needs to reach full secondary treatment at the three largest facilities in the region. On a county level, relative needs will be greatest in Riverside, Ventura and Imperial counties. Level of treatment will become increasingly important to receiving waters as the region expands, as will be enlargement or rehabilitation of collection systems in selected areas of the region.

Table 11-2

WASTEWATER DISTRICTS WITH AVERAGE FLOWS CURRENTLY EXCEEDING 75% OF CAPACITY

	<u>% of Existing Capacity Used by Average Flows</u>
<u>VENTURA COUNTY</u>	
Ojai Valley Sanitary District	87
* City of Oxnard	86
Saticoy Sanitary District	278
* Simi Valley Co. Sanitation District	92
* City of Thousand Oaks (Hill Canyon Plant)	90
* Triunfo Co. Sanitation District	89
Ventura Co. Waterworks District #1 (Moorpark)	93
<u>LOS ANGELES COUNTY</u>	
City of Avalon	134 (summer)
City of Los Angeles	
-- Hyperion	94
-- LA/Glendale Plant	100
County Sanitation Districts	
-- Joint Water Pollution Control Plant	94
-- San Jose Creek WRP	82
-- Whittier Narrows WRP	80
-- Pomona WRP	100
-- Los Coyotes WRP	93
* -- Lancaster WRP	124
Los Angeles Co. Public Works Dept.	
-- Lechuza Pt. Plant	83
-- Trancas Plant	83
-- Malibu Mesa Plant	100
<u>ORANGE COUNTY</u>	
* Capistrano Beach Sanitary District	86
* Co. Sanitation Districts of Orange County	98
* Dana Pt. Sanitary District	80
El Toro Water District	92
* City of San Clemente	85
* City of San Juan Capistrano	88

* Additional capacity is funded within these districts to partially or completely accommodate existing or anticipated shortfalls. Some districts without an asterisk have planned expansions which are currently unfunded.

Source: SCAG, Infrastructure Capacity Analysis, Wastewater Component, 1985.

<u>RIVERSIDE COUNTY</u>	
* City of Banning	100 +
* City of Beaumont	87
City of Blythe	85
* City of Coachella	83-100
City of Riverside	86
Coachella Valley Water District (Bombay Beach)	89
Eastern Municipal Water District	
-- Hemet-San Jacinto Plant	84
-- Sunnymead Plant	76
Edgemont Community Service District	100
Mecca Sanitary District	87
<u>SAN BERNARDINO COUNTY</u>	
* Big Bear Area Regional Wastewater Agency	78
* CHINO BASIN MUNICIPAL WATER DISTRICT	
* -- Regional Plant #2 (Chino)	94
-- Regional Plant #3 (Fontana)	100 +
Helendale Co. Service Area	88
San Bernardino Valley Municipal Water District	
-- City of Redlands	78
-- City of San Bernardino	80-95
Victor Valley Wastewater Reclamation Authority	77
<u>IMPERIAL COUNTY</u>	
City of Brawley	96
City of Calipatria	100 +
* City of El Centro	80
City of Holtville	77
Niland Sanitary District	88
* Seeley Co. Water District	89
City of Westmorland	125 (sewer hook-up moratorium in effect)

Table 11-3

WASTEWATER DISTRICTS WITH CURRENT NEED TO
REHABILITATE OR EXPAND COLLECTION SYSTEMS

VENTURA COUNTY

City of Oxnard

City of Ventura

Ventura Co. Waterworks District #1 (Moorpark)

LOS ANGELES COUNTY

City of Avalon

City of Burbank

City of Los Angeles

County Sanitation Districts of Los Angeles

RIVERSIDE COUNTY

City of Banning

City of Beaumont

Elsinore Valley MWD

City of Riverside MWD

Valley Sanitary District

SAN BERNARDINO COUNTY

Chino Basin MWD

City of Barstow

City of Needles

Crestline Sanitation District

IMPERIAL COUNTY

City of Calexico

City of Calipatria

City of El Centro

City of Heber

Source: SCAG, Infrastructure Capacity Analysis: Wastewater Component,
1985.

SOLID WASTE

Management of solid wastes is a problem currently facing the SCAG region and can be expected to become greater with continued population and economic growth, especially at the growth levels in the Baseline Projection. Although these wastes are nonhazardous, they far exceed the quantities of hazardous wastes generated annually (by a factor of 20), and consist of residential wastes (trash, rubbish, and garbage produced by households); construction wastes; commercial and industrial wastes; home appliances and abandoned vehicles; and sludge residues (waste remaining at the end of sewage treatment processes).

About 95% of solid waste generated in the region is disposed of in sanitary landfills. This method is currently the cheapest means for managing these wastes, despite rising costs for land, equipment, labor and environmental control systems. Landfill alternatives include reduction of wastes at the source of generation, recycling of waste materials, burning waste for energy recovery, and composting. However, these alternatives are only in limited use in the region today due to cost, market uncertainties concerning the sale of recyclable materials, and air quality concerns associated with the production of energy from solid waste. As such, land disposal remains the most utilized solid waste disposal technology in California today and is expected to remain so for at least the next decade or until alternatives gain much wider acceptance.

Land disposal of solid wastes is considered much safer than land disposal of hazardous wastes, and there are no state or federal laws banning land disposal of solid waste in the future. Newer and stricter standards for designing and operating landfills have abated many concerns about landfills constructed in recent years, but nonetheless some older landfills still have environmental problems. These problems include migration and release of methane gases from landfills and the generation of leachate which can pollute surface or groundwater. Nuisances, such as odors and vectors, also have plagued some landfills.

The most critical solid waste management problem is that amounts of solid wastes are increasing while landfill capacities are declining. Annual quantities of solid waste are increasing due not only to population growth, but also to increasing per capita generation rates. In other words, even without population growth, solid waste quantities are increasing rather significantly and will continue to do so unless major consumer and behavioral changes occur to reverse the trend. At the same time, many landfills in the region have reached or are approaching capacity. The problem is most acute in urban areas where waste quantities are the highest and where suitable sites for new or expanded facilities are most difficult to find.

In addition, there is very strong citizen opposition to new or expanded facilities. Largely because of this opposition, only one new landfill of significant size has been sited in California in the past five years. Most increases in capacity have been accomplished by expanding existing

landfills, but total landfill capacity is still diminishing. Indications are that the problem may reach significant proportions as the region continues to grow, unless capacity can be greatly expanded and/or new alternative management solutions are implemented to ease pressure on landfills.

Future Impacts of Growth on Landfills

The following table summarizes current data on annual solid waste quantities generated in each county of the SCAG region, and quantities actually disposed of in landfills (as opposed to alternative management techniques). It summarizes the collective remaining capacity of all sanitary landfills within county areas, and the year in which total existing capacity will be depleted, based on existing fill rates. This data is based on published information from a recent report of the California Waste Management Board, A Comprehensive Plan for Management of Nonhazardous Waste in California, 1985.

The table also estimates annual quantities of solid waste to be disposed of by 2010, reflecting the population growth contained in the Baseline Projection. Annual increases in per capita generation are not assumed, (which, if assumed, would make the total considerably higher); the annual increase is estimated at 1.5%. Finally, the table indicates when existing landfill capacity in each county would be depleted, based on fill rates reflecting annual rates of Baseline growth. Population growth is used as the indicator for estimating solid waste increases because of the close relationship between these two factors. (In contrast, economic sector growth is the primary indicator used for estimating hazardous waste increases.)

It is important to note two major assumptions in the analysis. First, it assumes very heavy continued reliance on landfills, since the extent, timing, and viability of alternative management options, such as recycling and energy recovery, is so unknown. In reality, there are a number of resource recovery facilities being proposed, particularly in Los Angeles County. Recycling also is receiving limited attention. Second, it assumes that present landfill capacity will not increase over time (i.e., no new or expanded landfills). In reality, a number of new or expanded landfills are proposed in various areas of the region, but most, if not all, face very stiff citizen opposition--opposition that has been very effective in the past. In essence, these two assumptions make the analysis a "worse case" scenario of impacts. Both the expansion of landfills and/or the use of landfill alternatives could lessen the impacts considerably.

The table shows that without any more population growth in the region, combined existing landfill capacity in most counties will be depleted before the year 2000. Combined landfill capacity will be exhausted in the late 1980s or early 1990s in Ventura and San Bernardino counties, in the late 1990s in Los Angeles and Orange counties, and in 2025 and 2010, respectively, in Riverside and Imperial counties. (Note: At present fill

Table 12-1

EXISTING AND FUTURE (BASELINE PROJECTION) SOLID WASTE QUANTITIES
AND ESTIMATED SATURATION DATE OF EXISTING SANITARY LANDFILL
CAPACITY, BY COUNTY

<u>Existing (1984) Conditions:</u>	<u>Ventura</u>	<u>Los Angeles</u>	<u>Orange</u>	<u>Riverside</u>	<u>San Bernardino</u>	<u>Imperial</u>
Solid Waste Generated (Thousands Tons Per Yr-TTPY)	733	14,250	4,011	1,343	1,268	93
Solid Waste Disposal (TTPY)	705	13,700	3,519	1,211	1,143	89
Total Remaining Landfill Capacity (Thousand Tons)	3,501	174,900	42,175	49,450	7,794	2,286
Landfill Saturation Date Based on <u>Current Fill Rates</u>	1989	1997	1996	2025	1991	2010
<u>Baseline Projection Conditions (2010)</u>						
Estimated Solid Waste to be Disposed (TTPY) 2010	1,248	16,851	5,279	3,221	2,606	145
Landfill Saturation Date Based on Fill Rates Reflecting Annual Baseline Growth to Counties	1988	1996	1994	2007	1989	2003

Source for Existing Conditions: California Waste Management Board, A Comprehensive Plan for Management of Nonhazardous Waste in California, 1985.

rates, some individual landfills in each county will last longer than the years indicated, but as other sites close, those sites will be overburdened.)

The heavy population growth in the Baseline Projection will exacerbate the above situation. Taking into account the predicted annual growth to counties, landfill capacity would become saturated even earlier, as shown in the table. In Ventura and San Bernardino counties, saturation will be reached in 1988 and 1989, respectively, in Los Angeles and Orange counties in 1996 and 1994, respectively, and in Riverside and Imperial counties in 2007 and 2003, respectively.

It is clear from examining the table that very near-term solutions need to be found for managing solid waste in most counties of the region, regardless of population growth, since existing landfills are becoming rapidly saturated based on the solid waste generated by existing population. Growth will merely exacerbate existing problems. The state's comprehensive plan referenced earlier summarizes various solutions being sought in each county, as described below:

- Ventura County -- One existing landfill has potential for major expansion that would more than double the county's total existing landfill capacity and extend saturation from the late 1980s until after the turn of the century. The county also is attempting to site a new landfill.
- Los Angeles County -- A number of new or expanded landfills are proposed which, if successful, could nearly quadruple existing landfill capacity and extend saturation well into the 21st century. (Many of the proposals remain politically volatile). Nearly 20 different resource recovery projects also are proposed as replacements for many closing landfills.
- Orange County -- Two existing landfills have potential for expansion and a new site is proposed, all of which could more than double existing landfill capacity.
- Riverside County -- Although total capacity is relatively ample in this county, the City of Riverside, Corona, and the W. Riverside, Elsinore and Rancho California areas all will need capacity in the 1980s. Two landfills and one expansion are proposed to provide this capacity.
- San Bernardino -- Expansion of only one landfill is proposed.
- Imperial -- No new or expanded landfills are planned. Capacity is ample until after 2000.

Although many of these county solutions appear promising, the major dilemma will be to overcome the many obstacles that stand in the way of their implementation. Chief among these is achieving social and political acceptance of new or expanded landfills, as well as siting of new waste-to-energy facilities, and other alternatives such as source reduction and

recycling. Ultimately, energy recovery facilities, source reduction and recycling will need to be implemented on a widespread scale, so that our dependence on landfills is sharply reduced.

HAZARDOUS WASTE

The management of hazardous wastes is one of the most critical environmental problems facing Southern California today, and one that is likely to become even more so as the region continues to grow and produce greater quantities of these wastes. Substantial amounts of hazardous wastes are generated each year, primarily by industry, and managed onsite, or shipped offsite, untreated, to Class I land disposal facilities. A relatively small amount of the wastes are actually treated offsite.

There are several problems relating to continued land disposal of untreated hazardous wastes. First, there have been many environmental and public health problems resulting from improper disposal, unsuitable disposal sites or inadequate maintenance of such sites, leading to contamination of land, water, and air. Several sites have been closed either because they have reached capacity, or because they do not meet new standards, and efforts are being made to clean up many of the other sites (inactive and abandoned sites) under the federal and state Superfund programs. In the early 1980s, four of the region's Class I landfills were closed due to environmental or economic reasons. By 1984, the major remaining facility in the region, BKK Corporation West Covina landfill was also closed. This has left the SCAG region dependent upon facilities outside the region--Casmalia in northern Santa Barbara County and Kettleman Hills in Kings County. Increasing pressure by concerned groups and individuals about landfilling of untreated wastes makes the long-term viability of even these two remaining sites questionable.

Second, land disposal costs are escalating rapidly, making land disposal less and less attractive economically. Related transportation costs are significant because of long distance hauls.

Third, rising disposal costs and long distance locations of disposal facilities have encouraged an unknown amount of illegal disposal. This dumping has occurred in isolated areas, in sewers and in storm drains.

Coupled with all of the above problems are recent amendments to the federal Resource Conservation and Recovery Act (RCRA) mandating virtual elimination of land disposal by 1990 for most untreated liquid hazardous wastes. Similar deadlines recommended by the State of California make it clear that landfills for hazardous waste disposal are on their way out.

The hazardous waste problem remains a management problem for current as well as future waste quantities. The approach now being aggressively pursued in the region is to treat the wastes rather than to simply dispose of them, so that future risks to society can be minimized. Treatment technologies are commercially available in the U.S., and several facilities currently operate in the region. However, there is a pressing need to site new facilities, and in the proper mix of technologies, to increase the treatment capacity of the region to provide for treatment of wastes currently sent to landfills.

The magnitude of the problem can be understood, in part, by examining current quantities of hazardous wastes generated in the SCAG region that are shipped offsite (predominantly for land disposal but also some treatment). It is these wastes in particular that will need to be treated in the very near future.

The best available estimates come from manifest files of the Department of Health Services, as summarized in the Southern California Hazardous Waste Management Project's The Problems and Needs for the Management of Hazardous Wastes in Southern California. These files reveal that in 1983, 986,350 tons of hazardous wastes were shipped offsite within the SCAG region. The Southern California Hazardous Waste Management Authority is identifying the number and type of treatment facilities needed in the region for these current wastes, and is proactively working to site, permit, and finance these facilities over the coming years. Both the private and public sectors are involved in this major commitment by the region.

Future Quantities of Hazardous Waste

Hazardous waste quantities are expected to increase over the coming years, as a result of economic growth (economic activity being the primary generator of hazardous wastes). A rough estimate is made on the following table of year 2010 annual quantities of offsite generation under the Baseline Projection, as compared to 1983 annual quantities. This estimate was derived by examining approximate amounts of hazardous waste currently generated by various economic sectors, and then applying the employment growth rates expected within these sectors during 1980-2010 to the amounts of wastes currently generated. It was assumed (1) that the share of wastes sent offsite by industries would be the same as currently; (2) that the amount of waste generated by each industry would grow in the same proportion as jobs would grow within that industry; and (3) that resource recovery of wastes would remain constant.

It is widely recognized by many that future hazardous waste generation estimates are, at best, a guess as to the state of the economy, government regulations and enforcement, manufacturing processes and overall incentives for reductions or recycling of wastes. Because these factors are so uncertain, predicted economic trends are one of the few relatively firm indicators available, and therefore are the basis for the following projection.

As seen from the table, the annual amount of offsite hazardous waste generated can be expected to increase by at least 16% over the next 30 years, based on economic growth alone. This is a very conservative estimate, and it is seemingly low because most of the economic sectors that generate hazardous waste are expected to undergo relatively low employment growth, relative to total regional employment growth. Other sources have predicted larger increases in hazardous waste, based on more generalized economic indicators. For example, the Southern California Hazardous Waste Management Project tentatively estimated a 50% increase by 2000 based on national industrial growth projections. The Los Angeles County Solid Waste Management Plan (hazardous waste portion) predicts a 27% increase in

Table 13-1

ESTIMATED AND PROJECTED OFFSITE HAZARDOUS WASTE GENERATION
SCAG REGION, 1983-2010

Industries Generating Hazardous Wastes	1983 Generation (thousand tons/year) ¹	% Total ²	Baseline Projection Employment Increase (%) 1980-2010 ³	2010 Generation (thousand tons/year)
Oil and Gas Extraction	197	20%	4.7%	206
Chemicals & Allied Products	197	20	17.9	232
Petroleum & Coal Processing	296	30	-8.2	273
Fabricated Metal Products	49	5	18.4	58
Electric & Electronic Equip.	49	5	66.4	82
Transportation Equipment	49	5	13.4	56
Electric, Gas, & Sanitary Services	70	7	103.4	142
Miscellaneous Code Groups (Agriculture, Construction, etc.)	79	8	19.5	94
TOTAL	986	100%	15.9%	1,143

¹ The total quantity of waste generated (986,000 tons) comes from State Manifest files summarized in the Problems and Needs for the Management of Hazardous Wastes in Southern California, Southern California Hazardous Waste Management Project, January 1985. The total is allocated among industries according to percents in column to right.

² Percent distribution among industries derived from Alternatives to the Land Disposal of Hazardous Wastes, An Assessment for California, Governor's Office of Appropriate Technology, 1981.

³ Percent increase reflects projected job growth in that industry under the Baseline Projection.

Los Angeles County alone by 2005. Many critical factors may individually and significantly increase or decrease the amounts predicted above, as mentioned below:

- New manufacturing processes may introduce new and different hazardous materials into the waste stream, exacerbating or possibly ameliorating the extent of the problem.
- New federal and state regulations banning use of surface impoundments and lagoons may result in an increase of wastes shipped offsite.
- Hazardous wastes may increase from previously unregulated sources.
- Consumer consumption patterns may significantly affect generated waste quantities either upward or downward.
- Contaminated soils and treatment residuals remaining from the cleanup of uncontrolled hazardous waste sites could greatly increase the demand for treatment and disposal facilities.
- Increased enforcement of pretreatment programs for industrial wastewater discharges intended to enhance the protection of water quality could possibly increase hazardous residuals.
- Concerns over liability may decrease amounts sent offsite. In addition, state and local goals are encouraging increased onsite management of wastes.
- Industry may be able to greatly reduce hazardous waste quantities through recycling and waste reduction, by substituting various raw materials or modifying process technology. Recycling and waste reduction is an explicit state and local goal.

Despite these many variables which will affect future hazardous waste quantities, the bottom line is that the region will likely continue producing substantial quantities of hazardous wastes. Unless alternative methods of managing the wastes can be instituted, and at sufficient levels, there could be very serious environmental and economic repercussions on the region. Environmental contamination would very likely occur from illegal disposal brought on by lack of land disposal and treatment options. Economically, many industries could actually leave the region because of unavailable facilities for managing their hazardous wastes. In fact, the San Diego Association of Governments conducted a study in 1984 addressing economic implications (by 1995) of not acting on hazardous waste management solutions in San Diego County. Findings were that there would be:

- 20% less growth in civilian employment;
- 30% more unemployment;
- 2% less manufacturing employment than in 1985;

- 40,000 fewer people, primarily due to lack of jobs not attracting people into San Diego County;
- 6% less construction activity;
- \$4.5 billion loss in sales; and
- \$309 million loss in government revenues.

The Southern California region is working on treatment facility solutions to the hazardous waste management problem; the Hazardous Waste Management Authority, a joint powers authority of local governments, has been established to assist in the siting of new facilities, and in the fair share allocation of costs among responsible jurisdictions. A major challenge ahead will be to site new facilities in geographic locations where potential environmental risks will be minimized, and where they are convenient to generation sources. Another challenge will be to gain public acceptance of these facilities that in many respects are perceived just as threatening to the public as landfills. The Southern California Hazardous Waste Management Authority has developed a siting manual, adopted for use by the Authority, that includes a set of facility siting criteria to assist in the selection of sites. The criteria include:

- Protect residents of Southern California;
- Ensure structural stability of facilities;
- Protect surface water and groundwater;
- Protect air quality;
- Protect environmentally sensitive areas;
- Ensure safe transport of wastes; and
- Protect social and economic development goals of communities.

PART III
NATURAL ENVIRONMENT

AIR QUALITY

The Baseline projection points to significantly higher growth levels by the year 2010 than any used in previous air quality planning efforts. This growth includes the addition to the region of over half the 1984 employment levels -- a factor which, by itself, leads to increases in air pollution. When combined with concomitant increases in population, the projected growth could have a sizable impact on air quality and set back efforts to effect improvements. This chapter will analyze the air quality impacts of such growth.

The six-county SCAG Region contains three air basins (the basic geography of air quality analysis, planning and regulation), as shown in Figure 14-1: the South Coast Air Basin, the Ventura County Air Pollution Control District portion of the South Central Coast Air Basin, and the South East Desert Air Basin. This assessment addresses each of these basins.

As the South Coast Basin currently does not meet federal standards for four out of the six criteria pollutants, the following analysis is a critical first step for setting future emission control policies. The basin's non-attainment status for ozone (O_3) and carbon monoxide (CO) has resulted in sanctions by EPA for failure to meet clean air deadline of December 31, 1987, set by the Clean Air Act.

The chapter is organized as follows:

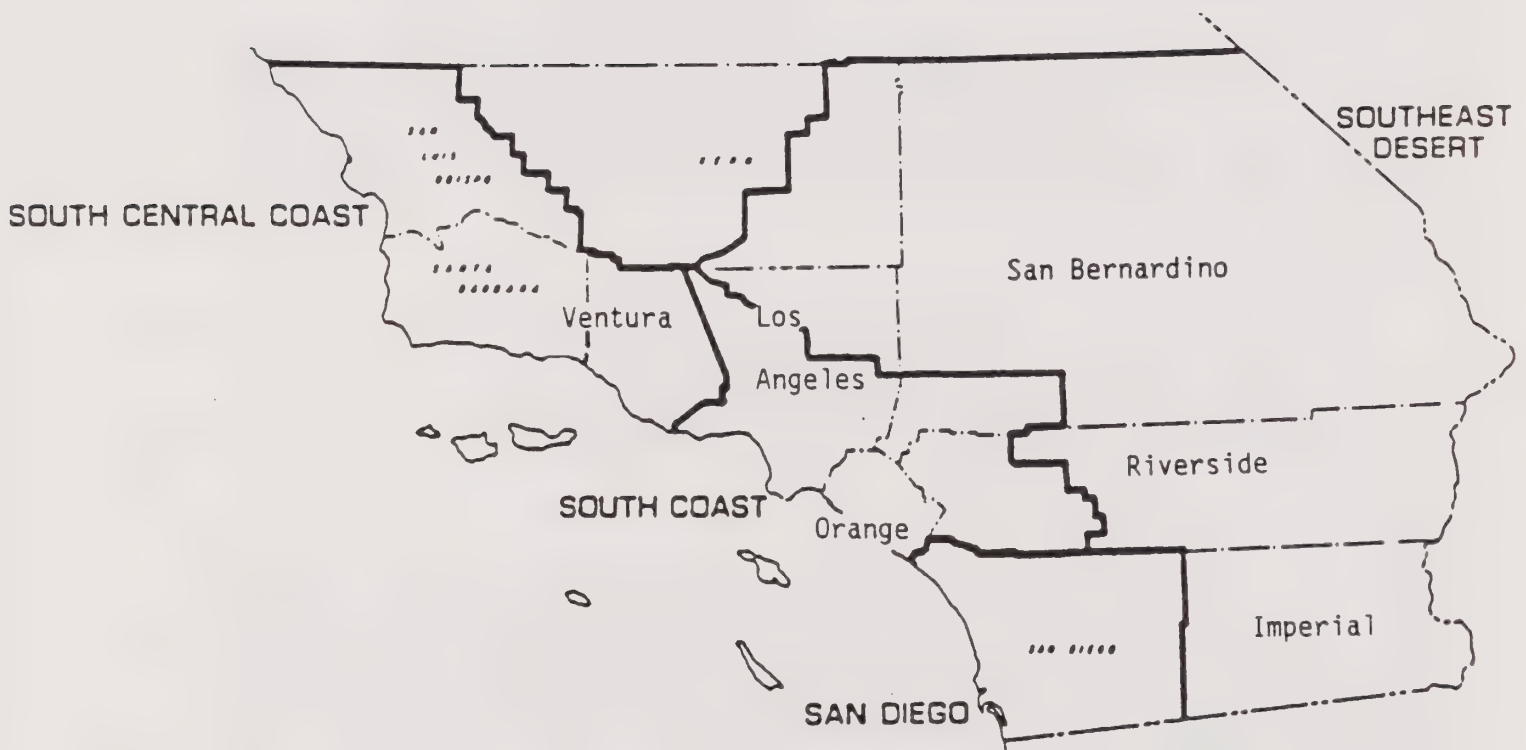
- Description of criteria pollutants and health effects,
- Analysis of base year (1984) conditions,
- Forecast of Baseline impacts (year 2010 emissions),
- Comparison to previous forecast (SCAG-82M),
- Outline of policy issues.

The Criteria Pollutants

There are two major factors which act on pollutant emissions to comprise basin air quality: photochemical reactions and meteorology/dispersion. Since SCAG does not maintain a model for forecasting air quality concentrations, this analysis will focus on forecast emissions relative to the levels allowable for attainment of air quality standards, as identified in the 1982 AQMP.

Ozone (O_3) - a colorless gas - results in eye irritation and damage to lung tissues, reduces resistance to colds and pneumonia, aggravates chronic heart disease, asthma, bronchitis and emphysema. The contaminant damages crops, and corrodes materials such as rubber and paint. Reactive organic gases (ROG) and oxides of nitrogen (NO_x) react in the presence of sunlight to form photochemical oxidants (ozone, the most prevalent component of smog). Although ozone is the air contaminant for which standards are set, its precursors (ROG and NO_x) are the emissions which must be controlled.

Figure 14-1
Southern California Air Basins



Carbon monoxide (CO) is a highly toxic odorless, colorless gas, which binds to hemoglobin in the bloodstream, replacing oxygen molecules. By reducing the oxygen-carrying potential of blood, CO causes heart difficulties in people with chronic diseases, reduces lung capacity, impairs mental abilities and may aggravate arteriosclerosis.

Nitrogen dioxide (NO₂, the principal NO_x pollutant) is a reddish-brown toxic gas, which increases the incidence of chronic bronchitis, lung irritations and influenza.

Sulfur dioxide (SO₂, the principal SO_x contaminant) is a colorless gas with a pungent, irritating odor; NO₂ and SO₂ both react to form particulates, and in the presence of moisture create acid mist. Sulfur dioxide damages and irritates lung tissue, aggravates symptoms of heart and lung disease, and accelerates corrosion of materials.

Suspended particulates (TSP or Total Suspended Particulates) are solid and liquid particles of dust, soot, aerosols, etc. which are small enough to remain suspended in the air; the state standard addresses particulates which are less than 10 microns in diameter (PM₁₀), which are considered respirable. Suspended particulates aggravate chronic disease and heart and lung disease symptoms, as well as reducing visibility and soiling surfaces; particulates often transport toxic elements, such as lead, cadmium, antimony, arsenic, nickel, vinyl chloride, asbestos, and benzene compounds, which then enter respiratory, digestive and lymphatic systems.

South Coast Basin: Base Year Conditions

Table 14-1 summarizes basin air quality for the year 1984. Basin ozone levels exceeded state and federal standards one-out-of-three and one-out-of-two days of the year, respectively. State and federal standards for carbon monoxide were exceeded one-out-of-five days of the year.

The basin exceeded federal standards for total suspended particulates (TSP) almost every other day of the year; it exceeded state standards for suspended particulates (PM₁₀) more than two-out-of-three days. The basin attained federal standards for sulfur dioxide and lead; about one-fifth of the area of the basin exceeded the annual average federal NO₂ standard. The basin exceeded state standards for nitrogen dioxide, sulfur dioxide and sulfate only slightly.

Table 14-1
1984 AIR QUALITY^a

<u>Pollutant</u>	Maximum days exceeding standards (Percent)	
	<u>Federal</u>	<u>State</u>
Ozone	39 %	49 %
Nitrogen dioxide ^b	18	1
Sulfur dioxide	0	0.3
Particulates (TSP)	46	(PM ₁₀) 71
Carbon monoxide	18	18
Sulfate	-	4
Lead	0	0

a. Source: 1983 Summary of Air Quality in California's South Coast Air Basin (with update through 1984).
SCAQMD, 1986.

b. Percent of stations exceeding annual average federal standard.

The estimated inventory of 1984 emissions (Table 14-3, page 14-5) which resulted in the above air quality impacts is based on the 1983 SCAQMD inventory (scaled to 1984 based on appropriate interpolated socio-economic growth by sector) and based on the 1984 SCAG analysis of on-road sources from the Regional Transportation Model (described in Chapter 9) and the Direct Travel Impact Model (DTIM), which calculates the resulting automobile emissions.

The 1984 air quality data above validates the emissions inventory, which will serve as the basis for the emissions forecast, in that both show that only the federal SO₂ standard was met, and that allowable levels for ROG, CO and TSP were exceeded. The inventoried or allowable NO_x level may need adjustment based on this validation.

Table 14-2
1984 INVENTORY

<u>Pollutant</u>	Level of Exceedence (Percent of Allowable)	
	<u>Federal</u>	<u>State</u>
Reactive organic gases	587 %	1,333 %
Nitrogen oxides	88	139
Sulfur oxides	34	135
Particulates	672	2,346
Carbon monoxide	251	269

Table 14-3
1984 SOUTH COAST AIR BASIN EMISSIONS BY MAJOR SOURCE
(Tons / annual average day)^a

--- SOURCE ---	ROG	NOX	SOX	TSP	CO
FUEL COMBUSTION					
Agricultural	0.1	0.0	0.0	0.0	0.0
Oil and Gas Prod	2.6	26.9	0.1	0.2	4.6
Petroleum Ref	4.3	51.0	4.8	4.2	7.5
Other manuf/ind	3.3	60.0	3.0	1.9	26.9
Electric Utilities	1.8	40.0	7.4	1.8	6.5
Other Services	2.1	33.6	6.0	1.8	9.5
Residential	1.4	31.0	0.8	1.7	12.0
Other	1.3	4.1	0.4	0.5	17.1
TOTAL	16.8	246.8	22.3	12.2	84.3
WASTE BURNING					
Agricultural	0.0	0.0	0.0	0.0	0.4
Range Mgmt	0.2	0.0	0.0	0.4	2.3
Incineration	0.0	0.1	0.0	0.1	0.1
Other	0.3	0.0	0.0	0.0	0.2
TOTAL	0.5	0.1	0.0	0.6	3.0
SOLVENT USE					
Dry Cleaning	19.6	0.0	0.0	0.0	0.0
Degreasing	34.9	0.0	0.0	0.0	0.0
Architect Coating	67.8	0.0	0.0	0.0	0.0
Other Surface Coat	140.8	0.1	0.0	0.9	0.0
Asphalt Paving	3.0	0.0	0.0	0.0	0.0
Printing	6.3	0.1	0.0	0.0	0.0
Domestic	91.9	0.0	0.0	0.0	0.0
Industrial Solvent	29.6	0.0	0.0	0.0	0.0
Other	3.1	0.0	0.0	0.0	0.0
TOTAL	396.9	0.2	0.0	0.9	0.0
PETROLEUM PROCESSES					
Oil and Gas Extrac	56.4	0.4	1.0	0.0	1.7
Petroleum Refining	18.4	10.3	34.9	5.6	12.5
Petroleum Marketin	38.6	0.0	0.0	0.0	0.0
Other	2.6	3.5	0.1	0.2	0.5
TOTAL	116.0	14.3	36.0	5.9	14.6
INDUSTRIAL PROCESSES					
Chemical	6.0	1.4	6.2	1.5	0.4
Food and Agric	8.9	0.3	0.0	9.8	0.3
Mineral Proc	0.2	8.5	2.4	3.8	1.3
Metal Proc	0.7	2.0	4.3	5.0	79.0
Wood and Paper	0.2	0.0	0.0	0.5	0.0
Other	5.0	0.2	0.0	0.4	0.0
TOTAL	21.0	12.4	12.9	21.0	81.0

Table 14-3 (continued)
1984 SOUTH COAST AIR BASIN EMISSIONS BY MAJOR SOURCE
(Tons / annual average day)^a

--- SOURCE ---	ROG	NOX	SOX	TSP	CO
MISC STATIONARY					
Pesticide Applic	11.2	0.0	0.0	0.0	0.0
Farming Operations	38.2	0.0	0.0	63.9	0.0
Construction & Demol	0.0	0.0	0.0	179.0	0.0
Road Dust - Paved	0.0	0.0	0.0	1,120.0	0.0
Road Dust - Unpav	0.0	0.0	0.0	85.7	0.0
Unplanned Fires	3.1	0.7	0.0	6.9	43.7
Solid Waste Lndfl	5.6	0.0	0.0	0.0	0.0
Other	6.2	0.7	0.2	0.9	0.1
TOTAL	64.3	1.4	0.2	1,456.3	43.8
ON-ROAD VEHICLES					
Light Duty Pass	422.0	188.4	17.1	32.5	3,166.5
Light/Med Trucks	130.8	67.3	6.8	9.0	1,044.4
Heavy Duty Gas Tru	52.6	33.8	4.3	2.7	932.4
Heavy Duty Diesel	26.2	91.1	23.3	18.7	70.9
Motorcycles	9.0	1.1	0.1	0.2	29.5
TOTAL	640.5	381.7	51.6	63.1	5,243.8
OTHER MOBILE					
Off-road Vehicles	27.4	10.9	1.3	0.8	116.0
Trains	5.3	20.1	2.3	1.2	9.5
Ships	1.0	29.5	22.6	2.5	2.5
Aircraft - Govt	0.0	0.0	0.0	0.0	0.0
Aircraft - Other	15.2	12.3	1.1	0.7	69.8
Mobile Equipment	15.6	58.6	4.9	7.2	145.3
Utility Equipment	12.6	2.1	0.2	0.3	136.2
TOTAL	77.2	133.5	32.3	12.7	479.4
STATIONARY	615.3	275.1	71.4	1,496.2	224.0
MOBILE	717.8	515.3	84.0	75.9	5,723.2
ON-ROAD	640.5	381.7	51.6	63.1	5,243.8
OTHER MOBILE	77.2	133.5	32.3	12.7	479.4
TOTAL SOUTH COAST	1,333.1	790.3	155.4	1,572.1	5,947.2
ALLOWABLE (STATE) ^b	100.0	570.0	115.0	67.0	2,210.0
ALLOWABLE (FED)	227.0	895.0	460.0	234.0	2,370.0

Table 14-3 (continued)
1984 SOUTH COAST AIR BASIN EMISSIONS BY MAJOR SOURCE
 (Tons / annual average day)^a

--- SOURCE ---	ROG	NOX	SOX	TSP	CO
STATIONARY SHARE	46.2%	34.8%	46.0%	95.2%	3.8%
FUEL COMBN	1.3%	31.2%	14.4%	0.8%	1.4%
WASTE BURNING	0.0%	0.0%	0.0%	0.0%	0.1%
SOLVENT USE	29.8%	0.0%	0.0%	0.1%	0.0%
PETROL PROCESSES	8.7%	1.8%	23.2%	0.4%	0.2%
INDUSTRIAL	1.6%	1.6%	8.3%	1.3%	1.4%
MISC	4.8%	0.2%	0.1%	92.6%	0.7%
MOBILE SHARE	53.8%	65.2%	54.0%	4.8%	96.2%
ON-ROAD SHARE	48.0%	48.3%	33.2%	4.0%	88.2%
OFF-ROAD SHARE	5.8%	16.9%	20.8%	0.8%	8.1%

- a. The Direct Travel Impact Model (DTIM) for 1984 provided emissions from on-road mobile sources. Emissions from other sources are based on the SCAQMD 1983 emissions inventory, scaled to interpolated Baseline socio-economic growth by sector.
- b. Target emission levels represent the 1982-AQMP estimated allowable levels of basin emissions to attain National Ambient Air Quality Standards (NAAQS), and California standards.

South Coast Basin: Baseline Emissions

Tables 14-8 and 14-9 (beginning on page 14-11) depict levels of emissions, with and without regional plan control measures respectively, given the SCAG Baseline 2010 growth projection. The 1982 Air Quality Management Plan, the 1984 Regional Transportation Plan, and the 1985 NO_x Plan provided the emission reductions used in the with-plan scenario. Only the short-term control measures as quantified for the year 2000 are included from the 1982 AQMP. This analysis applies the delta method for scaling emissions and planned emission reductions as follows:

Emission forecasts:

$$E_{10} = E_{00} + (S_{10} - S_{00}) * \frac{(E_{00} - E_{84})}{(S_{00} - S_{84})}$$

Where:

E_{10} = Forecast emissions for the year 2010,
 E_{00} = 82-AQMP emissions for the year 2000,
 E_{84} = Estimated emissions for 1984 from 1983 inventory,
 S_{10} = Baseline 2010 socio-economic data by appropriate sector,
 S_{00} = 82-AQMP 2000 socio-economic data by appropriate sector,
 S_{84} = Estimated 1984 socio-economic data by appropriate sector.

Emission reductions forecasts:

$$R_{10} = R_{00} + (S_{10} - S_{00}) * \frac{(R_{00})}{(S_{00} - S_{84})}$$

Where:

R_{10} = Forecast emission reductions for the year 2010,
 R_{00} = 82-AQMP emission reductions for the year 2000,
 S_{10} = Baseline 2010 socio-economic data by appropriate sector,
 S_{00} = 82-AQMP 2000 socio-economic data by appropriate sector,
 S_{84} = Estimated 1984 socio-economic data by appropriate sector.

The Baseline projection results in the following exceedences relative to federal and state standards: with plans (Table 14-4), basin emissions exceed levels allowable to meet federal and state standards for ROG, TSP and CO, and state standards for SO_x. Without plans, again ROG, TSP and CO exceed allowable levels to meet federal standards, and emissions from all five pollutants exceed state standards. Since the NO₂ standard has not been met, the Baseline projection underscores the need to review the inventoried and allowable levels for NO_x.

Under the with-plans scenario, emissions for all pollutants but SO_x are lower than 1984 levels (see Figure 14-2); without plans, both NO_x and SO_x emissions increase from 1984 levels. The state Air Resources Board forecasts concur on the decrease in emissions from 1984 to 2010, but show that emissions reach their lowest point in the mid-1990s. Thereafter, because of the impact of growth and ineffective implementation of current rules, all pollutants resume an upward trend to 2010.

Table 14-4
2010 WITH-PLANS SCENARIO

<u>Pollutant</u>	Level of Exceedence ^a (Percent of Allowable)	
	<u>Federal</u>	<u>State</u>
Reactive organic gases	361 %	819 %
Nitrogen oxides	61	95
Sulfur oxides	35	138
Particulates	299	1,046
Carbon monoxide	135	145

Table 14-5
2010 WITHOUT-PLAN SCENARIO

<u>Pollutant</u>	Level of Exceedence ^a (Percent of Allowable)	
	<u>Federal</u>	<u>State</u>
Reactive organic gases	489 %	1,109 %
Nitrogen oxides	92	144
Sulfur oxides	46	184
Particulates	327	1,143
Carbon monoxide	206	221

a. Exceedences are forecast relative to the the 1982-AQMP estimated allowable levels of basin emissions for attainment of National Ambient Air Quality Standards (NAAQS).

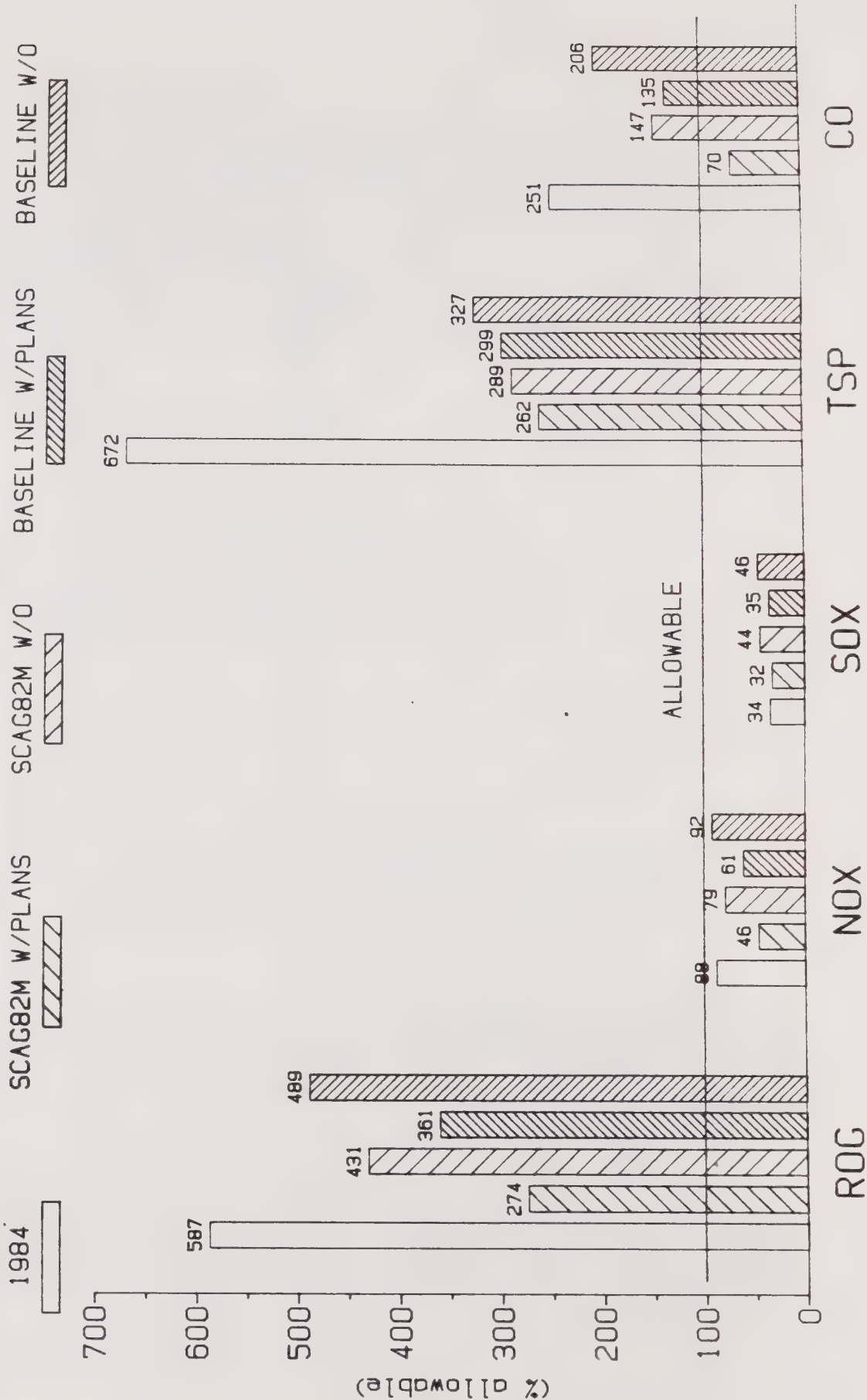
The Baseline projection forecasts that growth impacts will cause on-road mobile sources to lose much of the headway they were making in achieving planned emission reductions. While stationary source emissions grew with the population and employment, emissions from automobiles experienced a doubling effect.

Traffic volumes grew somewhat linearly with population and employment, but growth in the facilities to move those vehicles did not keep pace. (The existing-plus-funded transportation system was used for this analysis.) So congestion and delay increased, and speeds decreased, disproportionate to the region's socio-economic growth, resulting in greatly increased emissions.

Figure 14-2

Emissions

1984, SCAG82M-2010 and Baseline-2010 South Coast Basin (% of allowable)



Comparisons of lane-mile-equivalents of freeway facility deficiencies for Los Angeles and Orange Counties in 1984 and 2010 afternoon peak periods (3-6 pm) illustrate the worsening congestion (Table 14-6).

Table 14-6
PM-PEAK FREEWAY FACILITY DEFICIENCIES

<u>Forecast</u>	<u>Los Angeles Co</u>	<u>Orange Co</u>
1984	4.3%	4.9%
2010-SCAG-82M	11.4	27.1
2010-BASELINE	25.2	52.7

As expected, the Baseline With-Plans scenario indicates greater expected emission reductions than the Baseline Without-Plan scenario. However, the 1985 Reasonable Further Progress Report (the in-progress annual audit of the basin's progress in implementing the AQMP) shows a poor record regarding achievement of emission reductions from planned control measures:

Table 14-7
AQMP EMISSION REDUCTIONS ACHIEVED^a

<u>Source and Pollutant</u>	<u>Level of Plan Implementation</u> (tons/day, 1979-1985)		
	<u>Allowable</u>	<u>Achieved</u>	<u>Percent</u>
Stationary Sources			
Reactive organic gases	67.4	14.4	21.4%
Mobile Sources			
Reactive organic gases	73.6	45.4	61.7%
Carbon monoxide	914.7	332.5	36.3%

a. Source: 1985 Reasonable Further Progress Report.
SCAQMD and SCAG, 1987 (in progress).

The 1985 RFP shows that Plan measures were about half as successful as planned in reducing emissions, either because of the measures' levels of implementation or effectiveness. Hence, the 2010 with-plan scenario may be an overly optimistic forecast of emission reductions.

Table 14-8
2010 BASELINE WITH-PLANS
SOUTH COAST AIR BASIN EMISSIONS BY MAJOR SOURCE
 (Tons / annual average day)^a

--- SOURCE ---	ROG	NOX	SOX	TSP	CO
FUEL COMBUSTION					
Agricultural	0.1	0.0	0.0	0.0	0.0
Oil and Gas Prod	7.4	45.3	0.3	1.2	11.7
Petroleum Ref	4.7	33.0	7.5	9.4	7.4
Other manuf/ind	4.7	49.2	6.0	5.4	33.3
Electric Utilities	2.9	38.2	17.2	5.8	9.4
Other Services	3.6	33.3	14.6	6.2	14.3
Residential	2.3	28.7	1.7	5.4	16.9
Other	2.2	4.0	0.9	1.7	25.5
TOTAL	27.8	231.8	48.2	35.0	118.5
WASTE BURNING					
Agricultural	0.0	0.0	0.0	0.0	0.2
Range Mgmt	0.0	0.0	0.0	0.4	1.5
Incineration	0.0	0.3	0.5	0.1	0.0
Other	0.0	0.0	0.0	0.0	0.1
TOTAL	0.0	0.3	0.5	0.6	1.8
SOLVENT USE					
Dry Cleaning	14.6	0.0	0.0	0.1	0.0
Degreasing	27.8	0.1	0.0	0.1	0.0
Architect Coating	54.5	0.0	0.0	0.0	0.0
Other Surface Coat	89.8	0.2	0.0	3.8	0.3
Asphalt Paving	2.4	0.0	0.0	0.0	0.0
Printing	5.0	0.2	0.0	0.1	0.0
Domestic	68.8	0.0	0.0	0.0	0.0
Industrial Solvent	19.7	0.0	0.0	0.0	0.0
Other	2.1	0.0	0.0	0.0	0.0
TOTAL	284.6	0.5	0.0	4.0	0.3
PETROLEUM PROCESSES					
Oil and Gas Extrac	81.0	0.6	0.9	0.0	4.2
Petroleum Refining	10.2	5.6	12.2	2.9	11.9
Petroleum Marketin	30.5	0.0	0.0	0.0	0.0
Other	1.4	1.9	0.0	0.1	0.4
TOTAL	123.2	8.2	13.2	3.0	16.6
INDUSTRIAL PROCESSES					
Chemical	7.0	0.6	7.3	2.5	0.7
Food and Agric	8.1	0.1	0.0	13.0	0.4
Mineral Proc	0.3	4.0	2.9	6.6	2.4
Metal Proc	0.8	0.9	5.3	8.8	147.9
Wood and Paper	0.2	0.0	0.0	0.7	0.0
Other	6.1	0.1	0.0	0.7	0.0
TOTAL	22.5	5.8	15.5	32.3	151.4

Table 14-8 (continued)
2010 BASELINE WITH-PLANS
SOUTH COAST AIR BASIN EMISSIONS BY MAJOR SOURCE
 (Tons / annual average day)^a

--- SOURCE ---	ROG	NOX	SOX	TSP	CO
MISC STATIONARY					
Pesticide Applic	12.1	0.0	0.0	0.0	0.0
Farming Operations	41.5	0.0	0.0	17.5	0.0
Construction & Demol	0.0	0.0	0.0	68.3	0.0
Road Dust - Paved	0.0	0.0	0.0	427.1	0.0
Road Dust - Unpav	0.0	0.0	0.0	32.7	0.0
Unplanned Fires	3.1	2.3	0.0	1.8	82.0
Solid Waste Lndfl	7.9	0.0	0.0	0.0	0.0
Other	8.7	3.1	0.9	0.3	0.3
TOTAL	73.2	5.4	0.9	547.7	82.2
ON-ROAD VEHICLES					
Light Duty Pass	110.7	58.8	0.0	39.1	1,412.0
Light/Med Trucks	39.9	22.3	4.0	13.0	519.6
Heavy Duty Gas Tru	15.3	22.9	1.3	2.9	229.4
Heavy Duty Diesel	23.9	52.8	45.1	14.1	74.6
Motorcycles	4.9	0.8	0.2	0.2	33.0
TOTAL	194.8	157.6	50.5	69.3	2,268.6
OTHER MOBILE					
Off-road Vehicles	33.3	11.0	1.2	0.6	137.1
Trains	6.4	20.3	2.2	0.9	11.2
Ships	1.2	29.7	21.4	1.9	2.9
Aircraft - Govt	0.0	0.0	0.0	0.0	0.0
Aircraft - Other	17.3	11.6	0.9	0.5	77.1
Mobile Equipment	19.1	59.4	4.7	5.4	172.4
Utility Equipment	15.4	2.1	0.2	0.3	161.7
TOTAL	92.7	134.2	30.6	9.5	562.5
STATIONARY	531.4	251.7	77.8	622.0	369.2
MOBILE	287.4	291.8	81.1	78.7	2,831.0
ON-ROAD	194.8	157.6	50.5	69.3	2,268.6
OTHER MOBILE	92.7	134.2	30.6	9.5	562.5
TOTAL SOUTH COAST	818.8	543.5	158.9	700.7	3,200.2
ALLOWABLE (STATE) ^b	100.0	570.0	115.0	67.0	2,210.0
ALLOWABLE (FED)	227.0	895.0	460.0	234.0	2,370.0

Table 14-8 (continued)
2010 BASELINE WITH-PLANS
 SOUTH COAST AIR BASIN EMISSIONS BY MAJOR SOURCE
 (Tons / annual average day)^a

--- SOURCE ---	ROG	NOX	SOX	TSP	CO
STATIONARY SHARE	64.9%	46.3%	49.0%	88.8%	11.5%
FUEL COMBN	3.4%	42.7%	30.3%	5.0%	3.7%
WASTE BURNING	0.0%	0.1%	0.3%	0.1%	0.1%
SOLVENT USE	34.8%	0.1%	0.0%	0.6%	0.0%
PETROL PROCESSES	15.0%	1.5%	8.3%	0.4%	0.5%
INDUSTRIAL	2.8%	1.1%	9.8%	4.6%	4.7%
MISC	8.9%	1.0%	0.6%	78.2%	2.6%
MOBILE SHARE	35.1%	53.7%	51.0%	11.2%	88.5%
ON-ROAD SHARE	23.8%	29.0%	31.8%	9.9%	70.9%
OFF-ROAD SHARE	11.3%	24.7%	19.2%	1.4%	17.6%

- a. The Direct Travel Impact Model (DTIM) for 2010 provided emissions from on-road mobile sources. Emissions from other sources are based on the SCAQMD 1983 emissions inventory, scaled to Baseline socio-economic growth by sector. The 1982 Air Quality Management Plan, the 1984 Regional Transportation Plan, and the 1985 NOx Plan provided the emission reductions used in this scenario.
- b. Target emission levels represent the 1982-AQMP estimated allowable levels of basin emissions to attain National Ambient Air Quality Standards (NAAQS), and California standards.

Table 14-9
2010 BASELINE WITHOUT-PLANS
SOUTH COAST AIR BASIN EMISSIONS BY MAJOR SOURCE
(Tons / annual average day)^a

--- SOURCE ---	ROG	NOX	SOX	TSP	CO
FUEL COMBUSTION					
Agricultural	0.1	0.0	0.0	0.0	0.0
Oil and Gas Prod	7.8	73.9	0.5	1.4	12.6
Petroleum Ref	5.0	53.9	13.0	10.5	7.9
Other manuf/ind	4.9	80.4	10.4	6.0	35.8
Electric Utilities	3.0	62.4	29.7	6.5	10.1
Other Services	3.7	54.5	25.1	6.9	15.4
Residential	2.4	46.9	3.0	6.1	18.1
Other	2.3	6.6	1.6	1.9	27.4
TOTAL	29.3	378.6	83.3	39.3	127.3
WASTE BURNING					
Agricultural	0.0	0.0	0.0	0.0	0.2
Range Mgmt	0.1	0.0	0.0	0.4	1.5
Incineration	0.0	0.5	0.5	0.1	0.0
Other	0.1	0.0	0.0	0.0	0.1
TOTAL	0.2	0.5	0.5	0.6	1.8
SOLVENT USE					
Dry Cleaning	18.1	0.0	0.0	0.1	0.0
Degreasing	34.4	0.1	0.0	0.1	0.0
Architect Coating	67.6	0.0	0.0	0.0	0.0
Other Surface Coat	111.2	0.3	0.0	3.8	0.3
Asphalt Paving	2.9	0.0	0.0	0.0	0.0
Printing	6.1	0.4	0.0	0.1	0.0
Domestic	85.2	0.0	0.0	0.0	0.0
Industrial Solvent	24.4	0.0	0.0	0.0	0.0
Other	2.5	0.0	0.0	0.0	0.0
TOTAL	352.5	0.8	0.0	4.0	0.3
PETROLEUM PROCESSES					
Oil and Gas Extrac	113.3	1.0	1.4	0.0	4.2
Petroleum Refining	14.2	9.2	19.0	2.9	11.9
Petroleum Marketin	42.7	0.0	0.0	0.0	0.0
Other	2.0	3.2	0.0	0.1	0.4
TOTAL	172.3	13.4	20.5	3.0	16.6
INDUSTRIAL PROCESSES					
Chemical	9.4	1.1	7.3	2.7	0.7
Food and Agric	10.8	0.2	0.0	14.2	0.4
Mineral Proc	0.3	6.5	2.9	7.1	2.4
Metal Proc	1.1	1.5	5.3	9.6	147.9
Wood and Paper	0.3	0.0	0.0	0.7	0.0
Other	8.2	0.1	0.0	0.7	0.0
TOTAL	30.0	9.4	15.5	35.1	151.4

Table 14-9 (continued)
2010 BASELINE WITHOUT-PLANS
 SOUTH COAST AIR BASIN EMISSIONS BY MAJOR SOURCE
 (Tons / annual average day)^a

--- SOURCE ---	ROG	NOX	SOX	TSP	CO
MISC STATIONARY					
Pesticide Applic	13.4	0.0	0.0	0.0	0.0
Farming Operations	45.9	0.0	0.0	18.5	0.0
Construction & Demol	0.0	0.0	0.0	71.8	0.0
Road Dust - Paved	0.0	0.0	0.0	449.6	0.0
Road Dust - Unpav	0.0	0.0	0.0	34.4	0.0
Unplanned Fires	3.4	3.8	0.0	1.9	82.0
Solid Waste Lndfl	8.7	0.0	0.0	0.0	0.0
Other	9.6	5.1	0.9	0.3	0.3
TOTAL	81.1	8.9	0.9	576.5	82.2
ON-ROAD VEHICLES					
Light Duty Pass	180.1	81.3	0.0	54.3	2,335.7
Light/Med Trucks	64.9	30.9	4.1	18.0	859.5
Heavy Duty Gas Tru	24.9	31.6	1.4	4.0	379.5
Heavy Duty Diesel	38.8	73.0	46.0	19.6	123.3
Motorcycles	8.0	1.2	0.2	0.3	54.6
TOTAL	316.8	218.0	51.6	96.2	3,752.7
OTHER MOBILE					
Off-road Vehicles	45.7	15.9	1.6	0.7	184.3
Trains	8.8	29.3	2.8	1.1	15.0
Ships	1.7	43.1	27.7	2.2	3.9
Aircraft - Govt	0.0	0.1	0.0	0.0	0.1
Aircraft - Other	23.8	16.8	1.2	0.6	103.7
Mobile Equipment	26.2	86.1	6.1	6.5	231.8
Utility Equipment	21.1	3.1	0.3	0.3	217.3
TOTAL	127.3	194.3	39.6	11.4	756.0
STATIONARY	665.2	411.1	120.1	657.9	378.0
MOBILE	444.1	412.3	91.3	107.5	4,508.7
ON-ROAD	316.8	218.0	51.6	96.2	3,752.7
OTHER MOBILE	127.3	194.3	39.6	11.4	756.0
TOTAL SOUTH COAST	1,109.2	823.4	211.4	765.5	4,886.7
ALLOWABLE (STATE) ^b	100.0	570.0	115.0	67.0	2,210.0
ALLOWABLE (FED)	227.0	895.0	460.0	234.0	2,370.0

Table 14-9 (continued)
2010 BASELINE WITHOUT-PLANS
 SOUTH COAST AIR BASIN EMISSIONS BY MAJOR SOURCE
 (Tons / annual average day)^a

--- SOURCE ---	ROG	NOX	SOX	TSP	CO
STATIONARY SHARE	60.0%	49.9%	56.8%	86.0%	7.7%
FUEL COMBN	2.6%	46.0%	39.4%	5.1%	2.6%
WASTE BURNING	0.0%	0.1%	0.2%	0.1%	0.0%
SOLVENT USE	31.8%	0.1%	0.0%	0.5%	0.0%
PETROL PROCESSES	15.5%	1.6%	9.7%	0.4%	0.3%
INDUSTRIAL	2.7%	1.1%	7.3%	4.6%	3.1%
MISC	7.3%	1.1%	0.4%	75.3%	1.7%
MOBILE SHARE	40.0%	50.1%	43.2%	14.0%	92.3%
ON-ROAD SHARE	28.6%	26.5%	24.4%	12.6%	76.8%
OFF-ROAD SHARE	11.5%	23.6%	18.7%	1.5%	15.5%

- a. The Direct Travel Impact Model (DTIM) for 2010 provided emissions from on-road mobile sources. Emissions from other sources are based on the SCAQMD 1983 emissions inventory, scaled to Baseline socio-economic growth by sector.
- b. Target emission levels represent the 1982-AQMP estimated allowable levels of basin emissions to attain National Ambient Air Quality Standards (NAAQS), and California standards.

South Coast Basin: Comparison to Previous Forecasts

Table 14-10 compares the Baseline scenarios to SCAG-82 Modified (SCAG-82M), a 1984 modification to SCAG's 1982 growth forecast policy. Both forecasts continue to show SO_x and NO_x emissions below allowable levels needed to meet federal standards, and continued exceedences of ROG, CO and TSP allowable levels, with the Baseline projection resulting in an even wider gap between forecast and allowable emissions.

For each pollutant analyzed, the Baseline projection of basin growth would erase much of the progress planned through emission reductions.

The figures on pages 14-16 through 14-20 compare the relative contributions of sources to emissions for the various forecasts. Changes in the fleet mix contribute to reduced emissions from automobiles for ROG, NO_x and CO. Lack of controls on other-mobile sources leads to continuing increases in both their net emissions and their share of basin emissions for ROG, NO_x, SO_x and CO.

The new emission factors (EMFAC7C) used in the Direct Travel Impact Model (DTIM) result in very low emissions, and result in seemingly overstated reductions forecast for on-road mobile sources despite the growth from 1984 to 2010 in vehicle miles traveled.

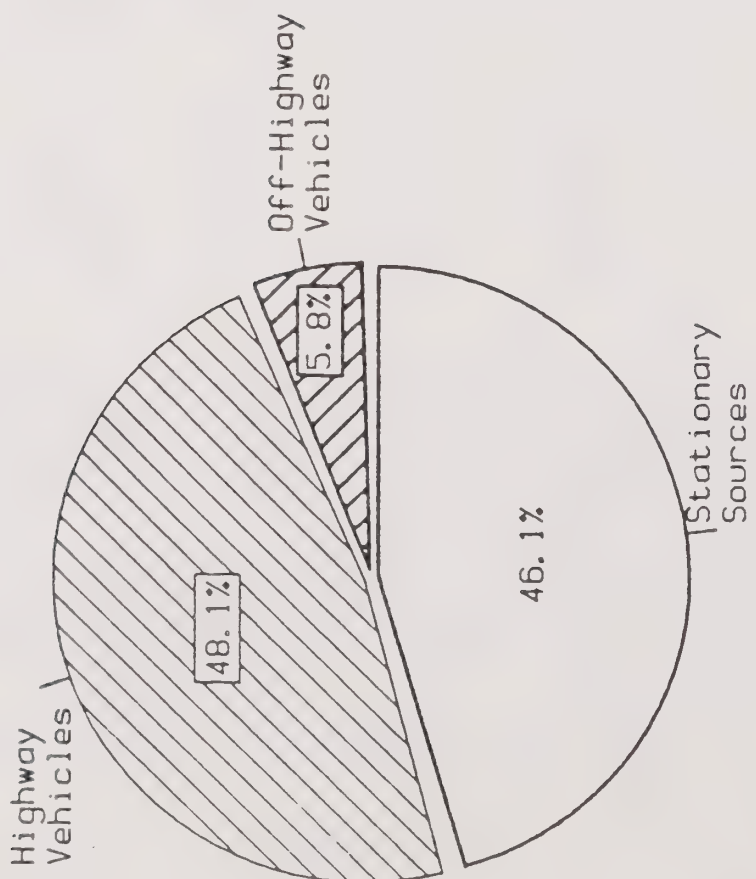
The only pollutant which increases from its mobile source 1984 level is total suspended particulates, for which the main vehicular source is tire wear; these increases in TSP emissions have little impact on the basin's intense particulate emissions, recorded in the 1983 inventory as stemming mainly from road dust.

Table 14-10
SOUTH COAST AIR BASIN
BASELINE EMISSIONS COMPARED TO PREVIOUS FORECASTS (SCAG-82M)
(Year-2010, tons per annual average day)

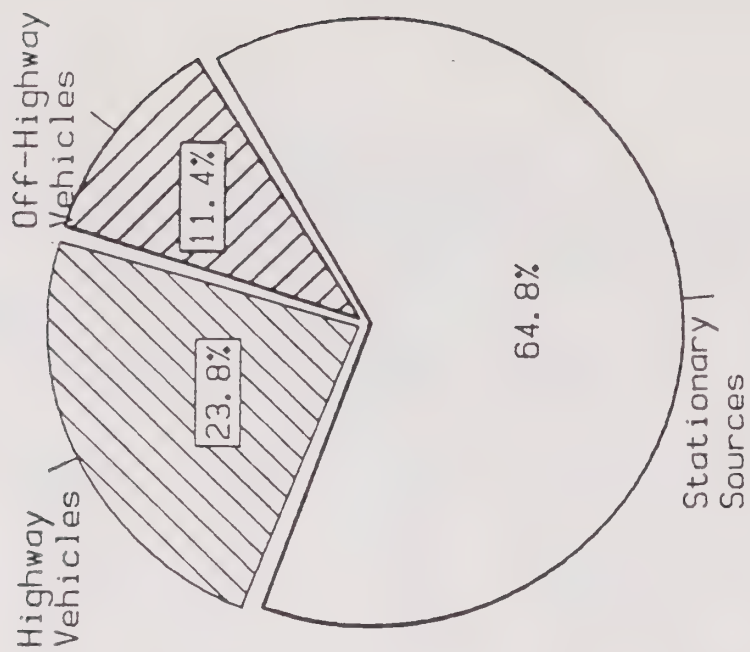
POLLUTANT BY SOURCE	ESTIMATED 1984	---SCAG82-M--- ^a		---BASELINE--- ^b		ALLOWABLE ^c
		WITH PLANS	WITHOUT PLANS	WITH PLANS	WITHOUT PLANS	
Stationary Sources						
ROG	615	465	637	531	665	
NOx	275	218	381	252	411	
SOx	71	70	115	78	120	
TSP	1,496	561	593	622	658	
CO	224	370	379	369	378	
On-Road Mobile Sources						
ROG	641	85	227	195	317	
NOx	382	100	163	158	218	
SOx	52	51	52	51	52	
TSP	63	44	73	69	96	
CO	5,244	840	2,429	2,269	3,753	
Other Mobile Sources						
ROG	77	72	115	93	127	
NOx	134	90	163	134	194	
SOx	32	26	37	31	40	
TSP	13	8	10	10	11	
CO	479	444	677	563	756	
TOTAL BASIN EMISSIONS						
ROG	1,333	622	979	819	1,109	227
NOx	790	408	707	544	823	895
SOx	155	147	204	159	211	460
TSP	1,572	613	678	701	766	234
CO	5,947	1,653	3,485	3,200	4,887	2,370

- a. Source for SCAG-82M emissions forecasts: Supplemental EIR on Modifications to the SCAG-82 Growth Forecast Policy. SCAG, 1984. (Table III-1, Page III-8.) The Direct Travel Impact Model (DTIM) for SCAG-82M Year-2010 provided emissions from on-road mobile sources, using EMFAC7C emission factors.
- b. The Baseline emissions projection applies Baseline growth projections by sector to the estimated 1984 basin inventory of emissions. The 1982 Air Quality Management Plan, the 1984 Regional Transportation Plan, and the 1985 NOx Plan provided the emission reductions used in the With-Plans scenarios.
- c. Target emission levels represent the 1982-AQMP estimated allowable levels of basin emissions to attain National Ambient Air Quality Standards (NAAQS).

ROG Emissions South Coast Basin

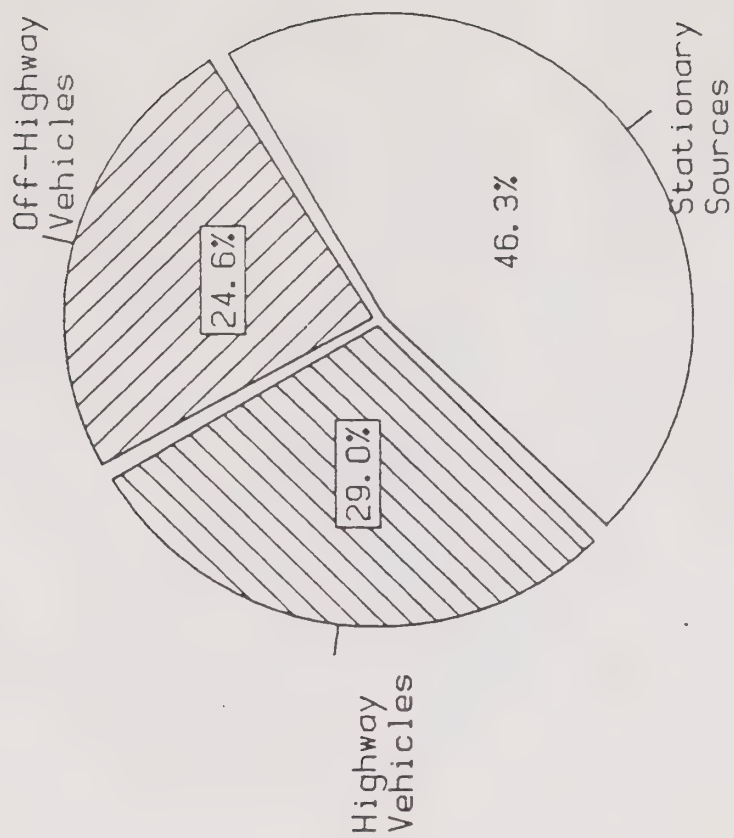


1984

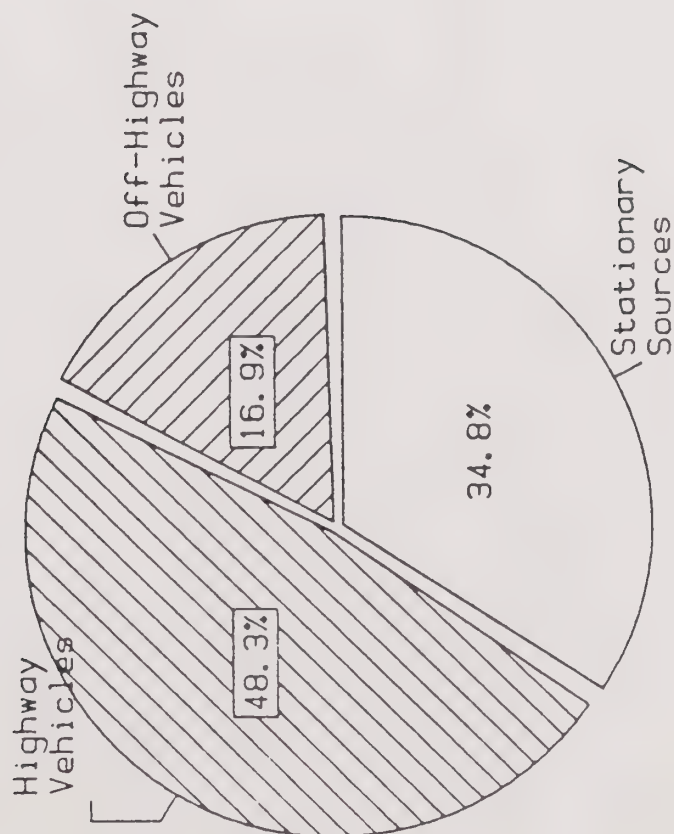


Baseline 2010
With-Plans

NOx Emissions South Coast Basin



*Baseline 2010
With-Plans*



1984

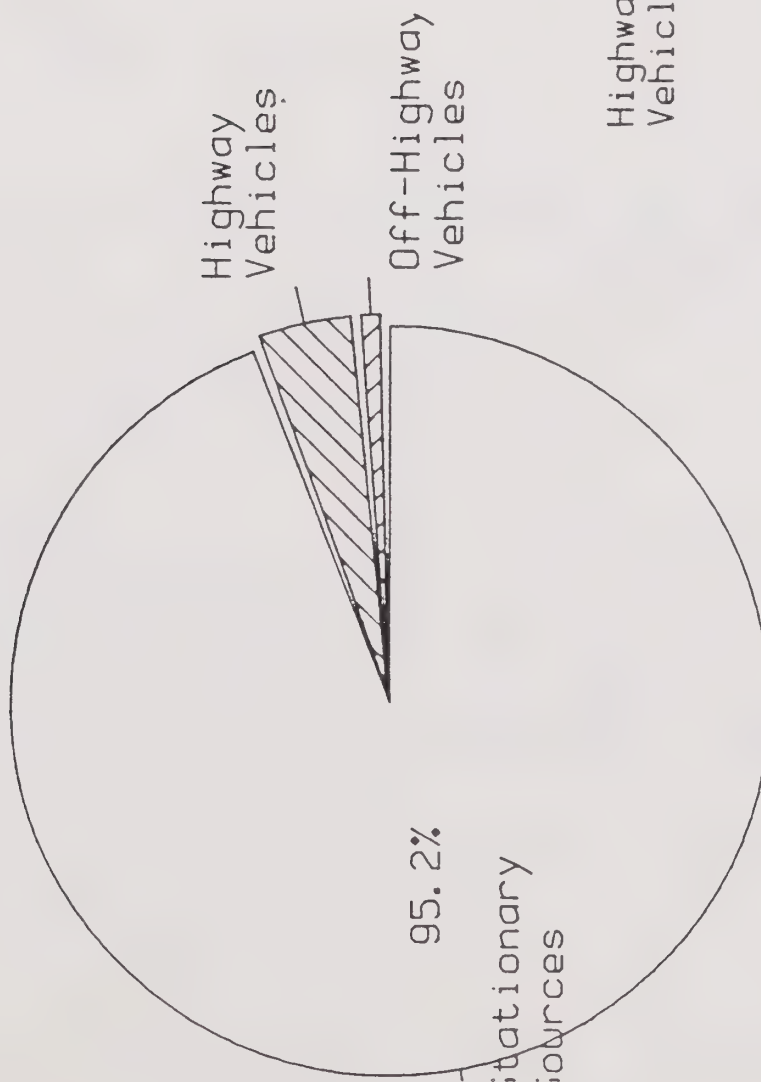
SOx Emissions South Coast Basin



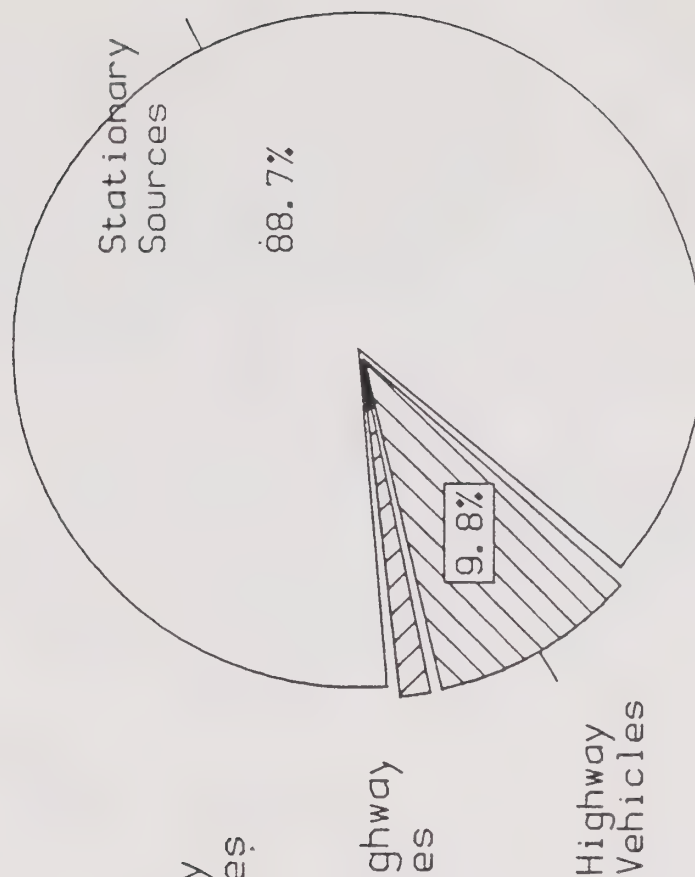
*Baseline 2010
With-Plans*

1984

TSP Emissions South Coast Basin

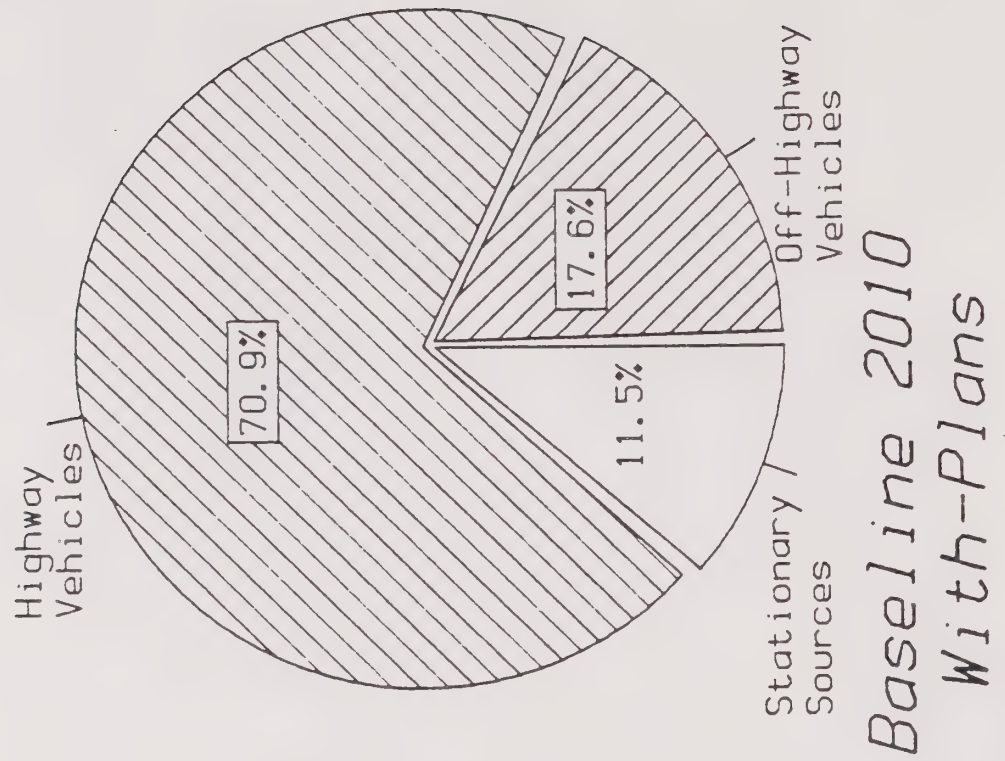
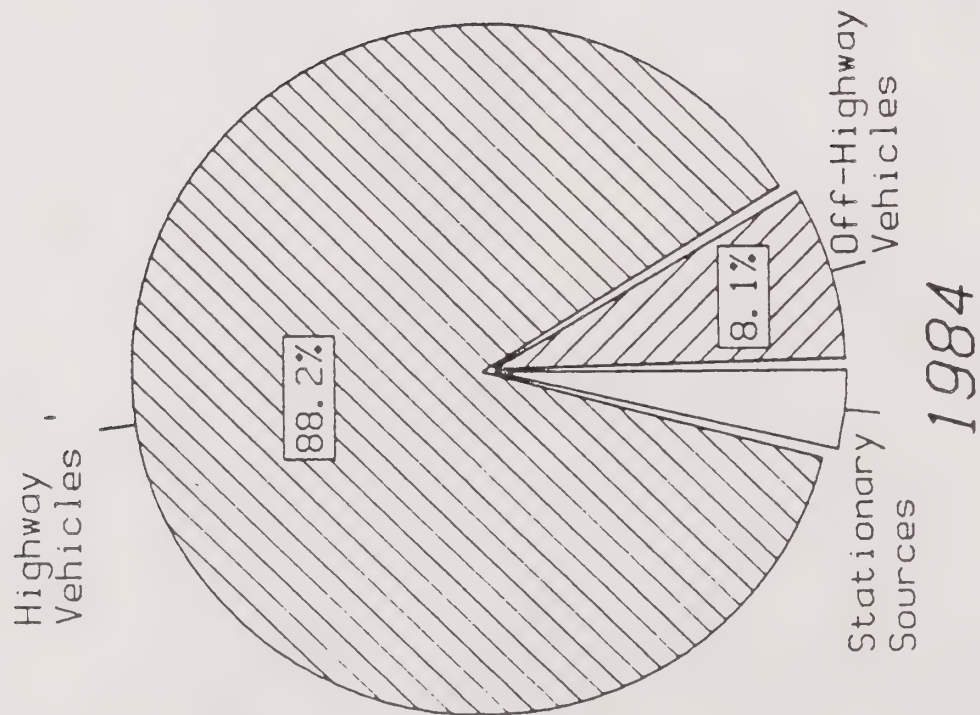


1984



Baseline 2010
With-Plans

CO Emissions South Coast Basin



Ventura County

The agency with lead responsibility for air quality planning and enforcement in Ventura County is the Ventura County Air Pollution Control District. Table 14-11 summarizes county air quality for the year 1984, for pollutants exceeding allowable levels. Monitoring stations in the county reported no exceedences for CO, NO₂, SO₂, SO₄ or lead for that year. The county exceeded federal ozone standards one-out-of-eight days, and state ozone and particulate standards one-out-of-three days in 1984.

Table 14-11
VENTURA COUNTY 1984 AIR QUALITY^a

<u>Pollutant</u>	<u>Percent of days exceeding standards</u>	
	<u>Federal</u>	<u>State</u>
Ozone	12 %	36 %
Particulates	(TSP) 0	(PM ₁₀) 36

a. Source: California Air Quality Data: 1984
Summary. ARB, 1985.

Table 14-12 compares 1984, SCAG-82M and Baseline county air basin emissions for ROG and NOx -- the criteria pollutants exceeding allowable levels and dealt with in the AQMP. County ROG contribution to ozone without plans is 8% lower in 2010 than 1984, solely due to a 50% drop in automobile emissions; even with growth, emissions decline as more new vehicles come into use which meet present exhaust standards (see Figure 14-8). Still ROG would exceed allowable levels by 50% by 2010, while NOx would decrease to just meet allowable levels. With current AQMP and RTP control measures, ROG would still exceed allowable levels for the federal primary ozone standard.

Comparing ROG emissions under the Baseline Projection versus the SCAG-82M forecast reveals a 21% growth in mobile source emissions, caused by higher population and worsening job/housing imbalance. But this growth is more than offset by reduced emissions from the county's lower employment levels under the Baseline Projection, so that total county ROG emissions under Baseline are 4% lower than SCAG-82M. But despite being lower than SCAG-82M, even with plans, levels are still higher than allowable to meet standards.

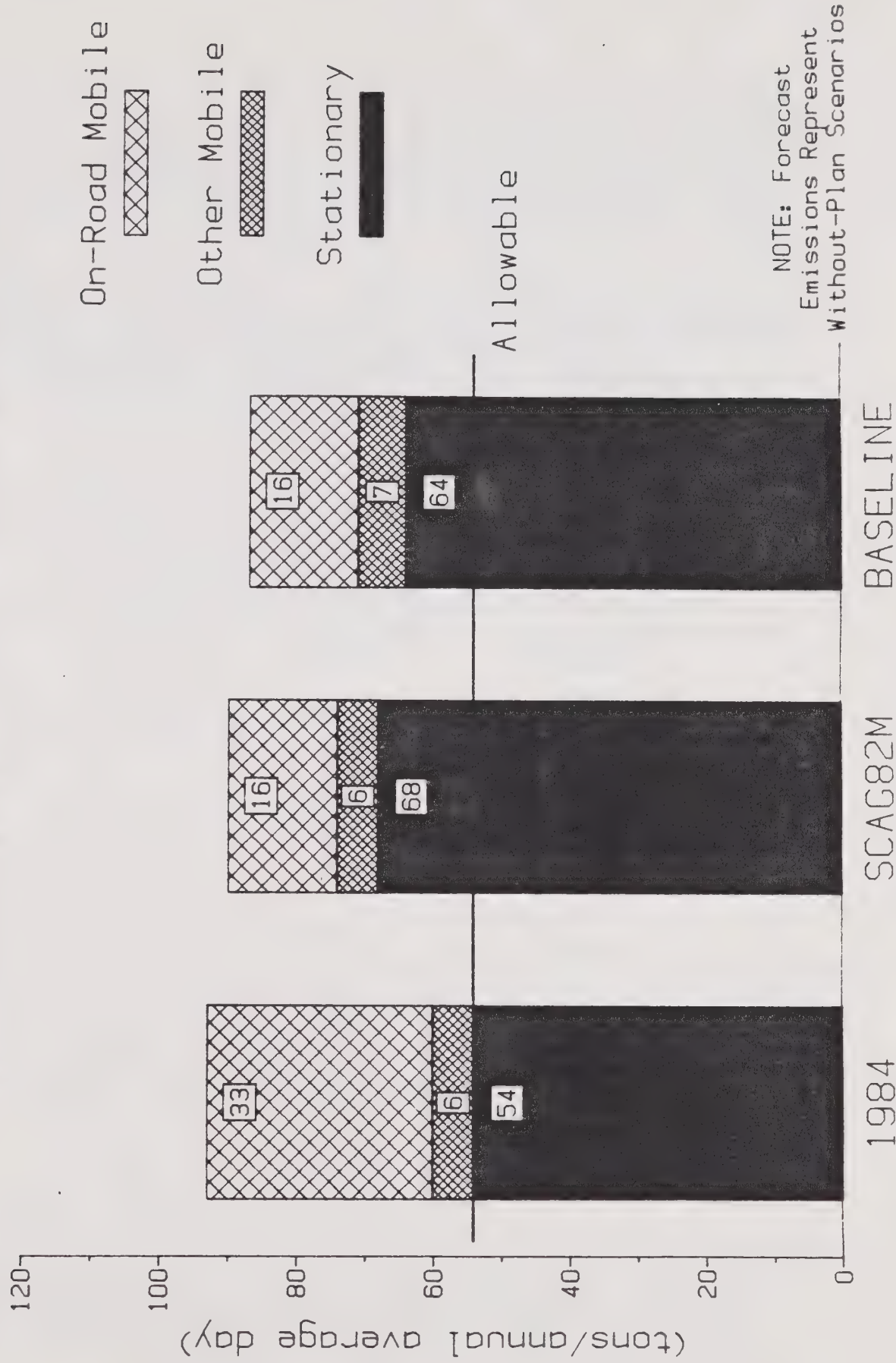
Table 14-12
VENTURA COUNTY BASELINE EMISSIONS COMPARED TO PREVIOUS FORECASTS
(Year-2010, tons per annual average day)

POLLUTANT BY SOURCE	ESTIM. 1984	---SCAG-82M--- ^a		---BASELINE--- ^b		ALLOW. ^c
		WITH PLANS	WITHOUT PLANS	WITH PLANS	WITHOUT PLANS	
Stationary Sources						
ROG	54	45	68	42	64	
NOx	33	26 ^d	32	24	30	
SOx	3	-	-	-	-	
TSP	117	-	-	-	-	
CO	31	-	-	-	-	
On-Road Sources						
ROG	33	11	16	11	16	
NOx	20	7	10	8	11	
SOx	2	2	2	2	2	
TSP	3	6	4	6	5	
CO	258	128	151	141	167	
Other Mobile						
ROG	6	7	6	7	7	
NOx	7	9	9	10	10	
SOx	1	-	-	-	-	
TSP	2	-	-	-	-	
CO	40	-	-	-	-	
TOTAL BASIN EMISSIONS						
ROG	93	62	90	60	86	54
NOx	60	42	51	42	51	52
SOx	6	-	-	-	-	-
TSP	122	-	-	-	-	-
CO	329	-	-	-	-	-

- a. Source for SCAG-82M emissions forecasts: Supplemental EIR on Modifications to the SCAG-82 Growth Forecast Policy. SCAG, 1984. (Table III-2). The Direct Travel Impact Model (DTIM) for SCAG-82M Year-2010 provided emissions from on-road mobile sources, using EMFAC7C emission factors.
- b. The Baseline emissions projection applies Baseline growth projections by sector to the estimated 1984 basin inventory of emissions. The 1982 Air Quality Management Plan (Alternative II) and the 1984 Regional Transportation Plan provided the emission reductions used in the With-Plans scenarios.
- c. Target emission levels represent the 1982-AQMP estimated allowable levels of basin emissions to attain National Ambient Air Quality Standards (NAAQS).
- d. Emissions were forecast only for ROG and NOx -- the criteria pollutants exceeding allowable levels and dealt with in the AQMP.

Figure 14-8

Reactive Organic Gas (ROG) Emissions Ventura County Basin, 1984 and 2010, By Source



Southeast Desert Air Basin

The agency with lead responsibility for air quality planning in the Southeast Desert Air Basin (SEDAB) is the Air Resources Board; the South Coast Air Quality Management District contributes some monitoring and other technical resources, and the San Bernardino County Air Pollution Control District sets regulations and permits sources in its jurisdiction.

Table 14-13 summarizes the basin's air quality for the year 1984, for pollutants exceeding allowable levels. Monitoring stations reported that the basin did not experience any exceedences for CO, NO₂, SO₂ or lead.¹¹ The basin exceeded federal ozone standards one-out-of-four days of the year, and state ozone standards almost every other day in 1984. The basin exceeded state particulate standards most days and state SO₄ standards one day in thirty.

Table 14-13
SOUTHEAST DESERT AIR BASIN 1984 AIR QUALITY^a

Pollutant	Percent of days exceeding standards	
	Federal	State
Ozone	25 %	44 %
Particulates	(TSP) 1	(PM ₁₀) 84
Sulfate (SO ₄)	-	3

a. Source: California Air Quality Data: 1984
Summary. ARB, 1985.

Table 14-14 compares 1984, SCAG-82M and Baseline county air basin emissions. In contrast to the South Coast Basin and Ventura County APCD, emission levels for all pollutants in this basin would grow between 1984 and 2010 under the Baseline Projection. This would result in basin emissions exceeding estimated allowable levels for ROG, NO_x, TSP and CO by over 300%, 25%, 35% and 80%, respectively. An allowable level is not available for SO_x, but SO_x emissions double from 1984 to Baseline.

-
11. Even though 1984 ARB air quality data (Table 14-13) shows no exceedences of standards for carbon monoxide, the basin's ARB inventory (Table 14-14) for CO exceeds allowable levels. This may either be caused by the spatial distributions of CO sources and monitors, or point to a need for adjustment in allowable levels.

As in Ventura County, the Baseline Projection indicates lower (10%) stationary source ROG emissions than under the SCAG-82M forecast, commensurate with the lower employment levels projected for outlying counties (see Figure 14-9). But in SEDAB this drop in stationary source emissions is not enough to offset the 31% growth in mobile source ROG emissions brought about by high population growth and worsening job/housing imbalance.

The intensive development plans for the Palmdale Airport, situated in and impacting SEDAB, also contribute to the higher mobile source emission levels under the Baseline Projection. The cumulative impact of these factors is that the Baseline Projection results in 6% higher levels of ROG emissions than did SCAG-82M for SEDAB, erasing the progress planned from mobile source emission reductions towards attaining air quality standards.

In addition, improving SEDAB air quality is complicated by transport from the South Coast Basin (see F.H. Shair, et al, The Impact of Transport from the South Coast Air Basin on Ozone Levels in the Southeast Desert Air Basin. California Institute of Technology for ARB, 1983). The study finds that high morning background ozone concentrations occurring in SEDAB are caused by transport of ozone (not precursors such as ROG) from the Los Angeles basin. On transport days, diurnal increases in ozone levels still result from local sources, but the background concentrations already exceed standards.

These findings point to the need to effect improvements in South Coast Basin air quality, as well as to achieve tighter local controls, in order to attain standards in the Southeast Desert Basin.

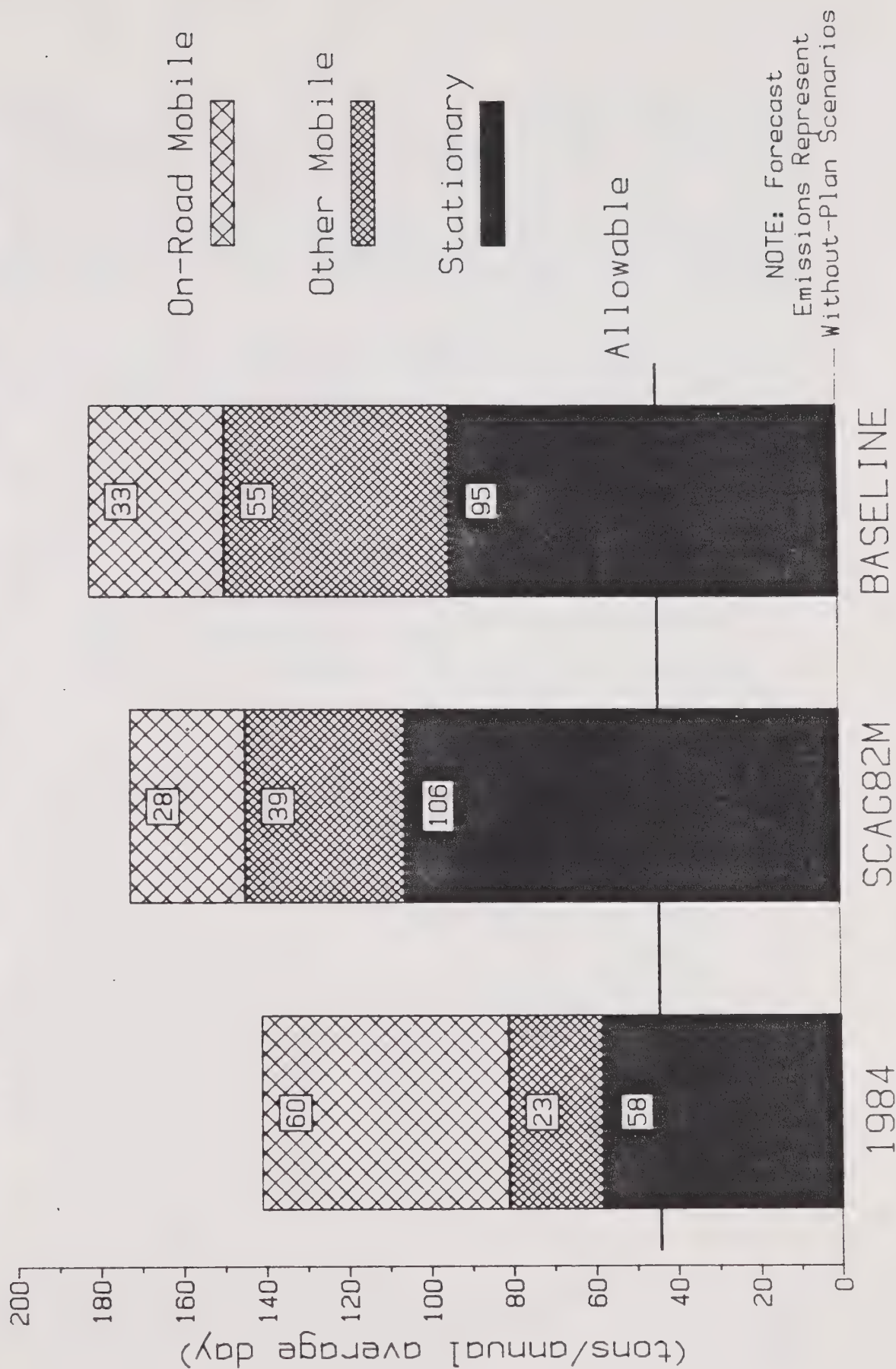
Table 14-14
SOUTHEAST DESERT (SEDAB) BASELINE EMISSIONS COMPARED TO PREVIOUS FORECASTS
(Year-2010, tons per annual average day)

POLLUTANT BY SOURCE	ESTIM. 1984	---SCAG-82M--- ^a		---BASELINE--- ^b		ALLOW. ^c
		WITH PLANS	WITHOUT PLANS	WITH PLANS	WITHOUT PLANS	
Stationary Sources						
ROG	58	106	106	95	95	
NOx	74	137	137	122	122	
SOx	16	36	36	32	32	
TSP	316	526	526	471	471	
CO	174	460	460	412	412	
On-Road Sources						
ROG	60	28	28	32	33	
NOx	67	35	35	39	39	
SOx	8	7	7	8	8	
TSP	11	17	17	19	19	
CO	485	276	277	344	345	
Other Mobile Sources						
ROG	23	39	39	55	55	
NOx	49	107	107	151	151	
SOx	6	14	14	19	19	
TSP	4	9	9	13	13	
CO	87	149	149	210	210	
TOTAL BASIN EMISSIONS						
ROG	141	173	173	183	183	44
NOx	190	279	279	312	312	250
SOx	30	57	57	60	60	- ^d
TSP	331	552	552	503	503	369
CO	746	885	886	965	967	531

- a. Source for SCAG-82M emissions forecasts: Supplemental EIR on Modifications to the SCAG-82 Growth Forecast Policy. SCAG, 1984. (Table III-3). The Direct Travel Impact Model (DTIM) for SCAG-82M Year-2010 provided the basis for estimating emissions from on-road mobile sources, using EMFAC7C emission factors.
- b. The Baseline emissions projection applies Baseline growth projections by sector to the estimated 1984 basin inventory of emissions. The 1979 SEDAB Air Quality Management Plan and the 1984 Regional Transportation Plan provided only minor levels of emission reductions used in the With-Plans scenarios.
- c. Target emission levels represent the 1979 SEDAB AQMP estimated allowable levels of basin emissions to attain National Ambient Air Quality Standards (NAAQS).
- d. Allowable emission levels for SOx not calculated in AQMP.

Figure 14-9

Reactive Organic Gas (ROG) Emissions Southeast Desert Basln (SEDAB), 1984 and 2010, By Source



Regionwide Policy Issues

The Baseline Projection paints a picture of slowed progress in improving Southern California air quality. There is no question that growth will adversely impact chances for eventual attainment of the health-based air quality standards. South Coast emissions projected for the year 2010 (Table 14-10) emphasize the importance of implementing the short-range measures of the 1982 AQMP as well as the need to go beyond those control measures to address the effects of growth.

As noted in Table 14-7, the basin is only achieving about half the planned short-range reductions. The 82-Plan also called for long-range control measures to address the basin's reductions shortfall, as illustrated in Table 14-15.

Table 14-15
1982 AQMP LONG RANGE CONTROL MEASURES
SOUTH COAST BASIN
Emission reductions
with short range measures
(Year-2000, tons/day)

<u>Measure</u>	<u>ROG</u>	<u>CO</u>
Energy use;		
Methanol Fueled Vehicles	59	788
Electric Powered Vehicles	51	526
Highway Electrification	19	195
Alternative Industrial Fuels	5	0
Petroleum Fuel Industry	75	0
Transportation and Urban Form:		
Transportation System Design	23	239
Telecommunications	8	82
High Speed Trains	10	17
Less-than-anticipated Growth	31	106
Commitments on Short-Range	29	50
Technology:		
Non-reactive solvents/coatings	184	0
Improved vehicle controls	39	693
TOTAL NET REDUCTIONS (no overlap)	443	1,673

Under the Baseline-2010 With-Plan scenario and the long-range emission reductions above implemented, the basin would attain the CO standard but still emit twice the allowable ROG emissions.

Work in progress. Several on-going programs will address the need for additional sources of emission reductions in the SCAG Region. The Ventura County APCD Draft 1987 AQMP, containing new modeling methodologies and recommending expanded transportation control measures is due in July 1987.

Southeast Desert Air Basin authorities are continuing to enforce regulations and permitting requirements for basin stationary sources, and are relying on the South Coast Basin to relieve their background ozone exceedences from transport.

In the South Coast Basin, the Draft 1987 AQMP due in December 1987 will examine and recommend strategies using the Baseline Projection as its growth forecast. The annual RFP report, due soon for 1985, will review progress on 1982 Plan implementation. SCAG is working with EPA Region-IX in assisting local jurisdictions under the Transportation / Air Quality Implementation Program (TAQIP) to implement 1982 measures as well as more recent measures, which will contribute additional reductions.

Linkage to growth. The air quality impacts of Baseline suggest that we must focus on more far-reaching control measures, especially ones linked to growth. Under TAQIP, local jurisdictions are developing transportation/land use ordinances to help mitigate traffic from new and existing development; under the 1987 South Coast AQMP, a regional indirect source regulation, alternative cleaner burning fuels, and other transportation control measures are being considered to reduce mobile source emissions from growth.

Costs. Measures to mitigate the air quality impacts of growth will require significant financial resources: The short-range control measures of the 1982 AQMP were estimated to initially cost \$800 million/year, even though over the long term, they result in a net annualized savings of \$430 million in the South Coast Basin. A survey conducted late last year revealed that the public is willing to pay for clean air, and would support a half-cent increase in gas taxes and bond issues to be used for alternative fuels programs to reduce air pollution.

Enhanced authority. The air quality impacts of Baseline growth present greatly increased challenges to those responsible for effecting air quality improvements. The basins must seek new resources, lobby for needed mandates, strengthen political will, and develop new partnerships if they are to address the air quality impacts of growth.

ENERGY

This section addresses expected trends in residential energy use associated with the Baseline Projection.

Residential Energy Use

The SCAG region contains seven different "climate zones," and the amount of energy used by residences, as well as commercial and industrial buildings varies widely among these zones, due to climate variations. For example, up to 2-1/2 times more energy is used for space conditioning (heating and cooling) by homes in the hottest inland area of the region (eastern Riverside and San Bernardino Counties) compared with similar homes in the more temperate coastal areas. Similar differences exist for commercial and industrial buildings among different climate zones. Heating and cooling are one of the largest consumers of building-related energy, along with lighting and appliance use. From a residential (or "building") energy conservation standpoint, the best location for additional building development in the region is in the coastal areas and inland temperate areas near the coast.

The focus of this analysis is on the amount and distribution of residential growth in the Baseline Projection relative to the various climate zones, illustrated in Figure 15-1. Table 15-1 shows the number and percent of additional residences that would be added to each climate zone (1984-2010) in the Baseline Projection, and the estimated annual energy consumption for space conditioning of new residences in each climate zone. Also shown is the percent of total energy consumed by each climate zone for residential space conditioning.

The consumption estimates are based on standards (budgets) established by the California Energy Commission for various types of new residential construction in different climate zones, as shown in Table 15-2; for ease of analysis, the estimates assume that all new dwelling units throughout the region will be single family units and will average 1,350 square feet. In reality, as discussed below, future residential growth in the region will consist of a variety of housing types, and this variety will greatly affect these estimates, since energy use varies according to not only climate zone but also housing type (i.e., single family vs. multifamily), as shown in the California Energy Commission standards.

As displayed in the table, approximately 1.4 million dwelling units would be added to the 3 more temperate climate zones of the region (Zones 6, 8, 9). This is 50% of all dwelling units added to the region. Based on the assumptions stated above, these units would collectively consume about 39 mbtu of energy for space conditioning per year, or 40% of all additional energy consumed in the region for residential space conditioning. In comparison, the same amount of housing--1.4 million dwelling units--would be added to the 4 hotter/colder zones (Zones 10, 14, 15, 16), but these units would consume approximately 57 mbtu of energy per year or 45% more energy than in the temperate zones. Clearly, there will be rather

Table 15-1

ANNUAL ENERGY CONSUMED BY ADDITIONAL
DWELLING UNITS IN BASELINE PROJECTION,
BY CLIMATE ZONE

<u>Climate Zone</u>	<u>Added Dwelling Units (1984-2010)</u>	<u>% of All Added Dwelling Units</u>	<u>Energy Consumed for Space Conditioning¹ (mbtu)</u>	<u>% of All Energy Consumed for Space Conditioning</u>
6 (Coastal Ventura, L. A., Orange)	444,400	15.7	10.0	10.4
8 (Orange Co. except coastal area)	449,500	15.9	10.4	10.8
9 (Central Ventura Co., Central L. A. Co.)	562,100	19.9	18.7	19.4
10 (W. Riverside Co.)	790,700	28.0	28.3	29.4
14 (Central Riverside Co., most of San Bernardino Co., NE L. A. Co.)	215,800	7.6	11.0	11.4
15 (W. Riverside Co., E. Riverside Co., Imperial Co.)	232,000	8.2	12.6	13.1
16 (N. Ventura Co., NW L. A. Co., Angeles Forest, Central Riverside Co.)	134,700	4.8	5.4	5.6
Total	2,829,200	100%	96.4	100%

¹ Assumes all added dwelling units are single family detached, averaging 1,350 square feet. Estimates based on state standards for new residential construction established for each climate zone. Mbtu = million btu.

Table 15-2

NEW RESIDENTIAL CONSTRUCTION--
ANNUAL SPACE CONDITIONING BUDGETS*

Climate Zone	Single Family Dwellings and Lodging Houses			Multi-Family Buildings		
	Heating	Cooling	Total	Heating	Cooling	Total
1	11.1	0.1	11.2	12.2	0	12.2
2	14.5	8.7	23.2	15.7	5.8	21.5
3	12.3	2.8	15.1	13.7	1.6	15.3
4	9.9	5.7	15.6	11.1	3.9	15.0
5	10.3	3.5	13.8	11.8	2.4	14.2
6	5.2	11.5	16.7	5.7	7.7	13.4
7	2.7	3.9	6.6	3.2	1.8	5.0
8	3.5	13.6	17.1	4.2	8.3	12.5
9	6.9	17.8	24.7	7.4	14.3	21.7
10	5.6	20.9	26.5	6.9	13.9	20.8
11	16.5	22.0	38.5	16.7	14.9	31.6
12	15.8	14.2	30.0	15.0	9.0	24.0
13	12.4	23.0	35.4	11.3	14.9	26.2
14	10.7	27.0	37.7	11.5	19.7	31.2
15	1.4	38.9	40.3	1.8	27.2	29.0
16	20.8	8.9	29.7	19.8	5.9	25.7

* Thousands of Btu per square foot of conditioned floor space per year.

Source: California Energy Commission, Energy Efficiency Standards, Regulations for Compliance, 1985 edition. P400-84-007.

significant energy savings associated with residential growth in the temperate climate zones of the region.

One complicating factor in the above analysis is that energy consumed in the temperate climate zones is probably significantly overstated because of the assumption regarding all new housing being single family. The denser urban areas of the region are located in these zones, and a large proportion of added housing will be multifamily; energy use per square foot for space conditioning in these types of structures is generally lower than for single family housing. In contrast, the warmer and mountain climate zones are in outlying areas where densities are lower, and where a larger proportion of added housing will be single family.

In conclusion, we may expect to consume significantly more energy in the region, given the amount of growth associated with the Baseline Projection. The amount will be significant despite increased energy efficiencies incorporated into new construction standards. The location (or distribution) of growth will be important, given the differences in consumption among different climate zones of the region. The greatest amount of energy savings will be gained by building in the coastal or inland temperate zones. For residential construction, multifamily units will clearly save more energy, particularly in the hotter/colder climate zones.

11. For example, the Santa Monica Bay subregion is located in the most temperate zone of the region and 98% of added housing is expected to be multifamily; in contrast, Central Riverside is located in one of the hotter climate zones and 70% of added housing is projected to be single family.

ECOLOGICAL RESOURCES

The Baseline Projection foresees a significant amount of growth to the SCAG region over the next 25 years. This growth poses the potential for severe threat to remaining ecological resources, depending on the specific locations (and nature) of future development, the specific patterns of recreational use, levels of air and water pollution, and protective or mitigative measures taken. Loss of ecological resources in this region is a critical issue; while many of these resources remain, particularly in the more undeveloped areas, many others have been degraded or lost to urbanization and its associated activities.

Marine and terrestrial ecosystems are vulnerable to both the direct and indirect effects of population growth. Direct impacts include degradation or actual elimination of plant and animal habitats resulting from the conversion of land to urban uses, while indirect impacts include effects to biota resulting from increased recreational activity, and from air and water pollution. Sensitive biota existing in areas where even little growth may occur, such as mountain and desert areas, can be very much affected by the indirect effects of population growth.

This section provides a generalized assessment of potential impacts on ecological resources of the region that could result from population growth in the Baseline Projection up through the year 2010. The section is divided into two subsections--Terrestrial Ecological Resources and Marine Ecological Resources.

Terrestrial Ecological Resources

The resources examined here are major vegetative or animal habitats, significant ecological areas, and rare or endangered plant and animal species existing in the region. The analysis is at the county level, examining projected population increases in the various subareas (subregions) of the counties against existence of the major biological resources mentioned above (habitats, significant ecological areas, rare/endangered species). The analysis is necessarily general as it is difficult to predict impacts with any accuracy without a disaggregation of the Baseline Projection to much smaller geographic units, and without knowledge of specific locations where future development will occur. Similarly, given the size of the region, only major ecological resources are considered.

As an overview to the assessment of future impacts, it is important to note that most of the remaining ecological resources of the region are located in the outlying "urbanizing" subregions and the foothill/mountain/desert subregions. Resources in the coastal plain and interior valleys of the highly urbanized subregions have suffered greatly from urbanization; most of the key resources remaining in these areas are along the coast, but even many of these resources have been degraded or destroyed by coastal development.

The Baseline Projection targets about 57% of total regional growth (3.4 million people) to the urbanizing subregions where, as stated above, many of the region's remaining natural resources exist. These subregions are in southern Ventura County, northern and western Los Angeles County, southeast Orange County, western Riverside County, the Coachella Valley and southwest San Bernardino County. (See Figure 18-1 in Open Space section for map of subregions.) Based on the high allocation of growth to urbanizing subregions, the impacts on ecological resources can be expected to be significant. Additionally, about 16% of the total growth (1.0 million people) would go to the mountain/desert subregions which are located in northern Ventura County, the Angeles/San Bernardino Forest areas of Los Angeles and San Bernardino Counties, eastern Riverside County, the majority of San Bernardino County, and Imperial County. These subregions likewise contain an abundance of natural resources.

The remaining 27% of growth (1.6 million) would go to the highly urbanized subregions located in Los Angeles and Orange counties. Factors influencing the fate of important ecological resources in the coastal areas of these subregions will be future levels of water pollution, amounts of increased recreational activity, and amounts of development allowed in coastal areas.

In short, the distribution of the region's projected growth among its various subareas will be very important determinants of how many ecological resources will be preserved or lost. Another key ingredient will be the extent of protective measures implemented to either avoid growth (or activities) in sensitive ecological areas, or to accommodate it with minimal disturbance to these important resources.

The following discussion highlights general impacts that could occur in each county, given the growth foreseen in the Baseline Projection.

Ventura County -- This county would undergo a population growth of over 450,000 or 77% by 2010 under the Baseline Projection. Nearly all growth would occur in the southern half of the county in the Oxnard/Ventura and Simi Valley/Thousand Oaks subregions. Although much plant and animal habitat still remains in these areas, much habitat has also been lost in the past few decades from urbanization and agricultural development. The growth projected for these areas will likely result in very significant additional loss or degradation of chaparral, oak woodland, grassland and wetland and riparian habitats.

Increased use and development of the coastal areas could seriously threaten the few remaining coastal wetlands in the Oxnard-Pt. Mugu area (particularly Mugu Lagoon). These areas are of special concern because they are rare, and they provide habitat for several rare or endangered species as well as large numbers of plants and wildlife. Species of concern are the California Brown Pelican, California Least Tern, Light-Footed Clapper Rail, Belding's Savannah Swallow and the Salt Marsh Bird's Beak.

Increased development or recreational activity in southern Ventura County could also threaten existence of the rare Ventura Buckwheat plant species, the rare Santa Monica Mountains Dudleya plant species of the Santa Monica

Mountains area, and the rare Santa Susana Tarweed of the Santa Susana Mountains.

Very minimal growth is projected for the northern Los Padres area of Ventura County. However, the very critical condition of the California Condor could be worsened by added human traffic in the mountains. The endangered Blunt-Nosed Leopard Lizard, and the rare Southern Rubber Boa of the Mt. Pinos area also could be further threatened by increased recreational activity.

Los Angeles County -- Many of the biological resources of this county have been lost to urbanization, but significant valuable habitats still remain in the coastal areas, the urbanizing areas, and the mountain/desert areas. The amount of growth in these areas will be very critical to the preservation of remaining ecological resources.

Overall, the county is projected to grow by 1.8 million people, or 23%.

In the northern area, the Santa Clarita Valley and North Los Angeles County subregions are projected to grow by 180,000 (200%) and 226,000 (190%), respectively. This is a significant amount of growth for these areas. Extensive loss of desert scrub, chaparral, pinyon-juniper, oak woodland and riparian habitats could occur. The rich habitat areas of the Antelope Valley and Mojave Desert, as well as the series of lakes along the north slope of the San Gabriel Mountains could be degraded by development activities and increased recreational use. Rare or endangered species at risk include the Mojave Ground Squirrel (Antelope Valley), Unarmored Threespine Stickleback (Santa Clarita Valley) and the California Condor.

Over one third of the county's growth (664,000 people) would occur in the western and south coastal areas. About 250,000 people are targeted for the San Fernando Valley subregion, which is highly urbanized, but nonetheless still possesses valuable natural vegetation in the Santa Susana Mountains and San Gabriel foothills. Also of particular concern would be the 83% growth (49,000 people) in the Santa Monica Mountain/Malibu subregion. Significant ecological areas there, such as Malibu Lagoon, Cold Creek, and Malibu, Tuna and Zuma Canyons could be degraded by development, excessive recreational use, or water pollution. Further loss of natural vegetation (chaparral, oak woodland, and riparian habitats) could also occur in the Santa Monica Mountains. Also of concern would be the 18% growth (230,000) in the Santa Monica Bay subregion, potentially posing a further threat to the Ballona Creek wetland areas, valuable ecological areas in the Venice/Playa del Rey, El Segundo and Palos Verdes coastal areas, and in Madrona Marsh in the Torrance area. Several rare or endangered species exist in these areas. Growth projected for the Long Beach/Downey subregion is modest in comparison with the other subregions mentioned above (134,000 people) but ecological areas in the coastal areas there are nonetheless of concern.

In the southeast area, significant predicted growth in the East San Gabriel Valley subregion (420,000) could result in degradation of remaining habitats in the Rio Hondo and San Gabriel River areas, as well as biotic

communities in the Puente, Chino, and San Jose Hills, and the San Gabriel Mountains' foothills.

The area of least concern is the central portion of the county. The 287,000 population increment is significant but very few important natural habitats remain.

Orange County -- A population growth of approximately 1 million people (50%) is projected for this county by 2010. Only about 20% of this growth is targeted to the highly urbanized northwest half of the county; the remaining 80% of county growth (796,000) is targeted to the southeast half of the county, which includes the Cleveland National Forest area as well.

It is important to note that Southeast Orange County would receive the largest growth increment of any of the 23 subregions in the SCAG area. (The next largest amount of growth would be in the Chino Basin subregion--619,000 people.) Much of this growth is anticipated in the south coastal area, but substantial growth also is anticipated in the eastern portion of the county. Given the tremendous growth projected for southeast Orange County, as well as the relatively large amount of important ecological areas remaining, it is expected that there would be significant impacts on ecological resources.

In the south coastal area, a major ecological area that could be severely degraded by development, overuse (recreational) or water quality degradation is the coastal wetlands in the Newport Beach area. A decrease in the habitat value of these wetlands could cause elimination of the rare or endangered Least Tern, California Black Rail, Light-Footed Clapper Rail, and Belding's Savannah Sparrow. Other significant ecological areas, such as San Joaquin Marsh, Aliso Creek and Wood Canyon, could be destroyed or degraded without adequate protective measures. Extensive loss of coastal chaparral and riparian habitat in the San Joaquin Hills and the hills farther south could also occur.

The eastern portion of the county would also be at risk from population growth; development could result in extensive loss of chaparral, oak woodland and riparian habitat in the Santa Ana Mountains' foothills. There are many significant ecological areas, such as canyons in the Santiago and San Juan Creek drainages, Loma Ridge, Caspers Regional Park, and various areas in Cleveland National Forest that could be negatively affected by development or recreational overuse.

The comparatively more moderate growth levels in northwest Orange County are of concern for coastal wetlands in the Seal Beach/Huntington Beach areas (Bolsa Chica, Anaheim Bay and mouth of Santa Ana River).

Riverside County -- This county is predicted to have the highest growth rate (166%) of all six counties, adding 1.3 million people to its 1984 population of 758,000 by 2010. Since it is a county still very rich and diverse in ecological habitats, this growth is of concern to the continued survival of these habitats.

The western Riverside/Corona subregion is projected to more than double during the 25-year period, adding about 480,000 population and making it the third largest growing subregion. This growth will result in some loss of remaining chaparral, grassland, oak woodland and riparian habitat. Development or increased recreation could destroy or degrade significant ecological areas along the Santa Ana River where two rare or endangered species reside (Least Bell's Vireo and California Yellow-Billed Cuckoo) and at Lake Matthews where the endangered Southern Bald Eagle winters. The rare Stephen's Kangaroo Rat in the eastern part of this area, as well as the neighboring subregion, could be threatened by development.

The Central Riverside subregion would undergo very high growth as well, adding about 462,000 people (a 236% growth rate). This subregion and the neighboring Idyllwild subregion contain many significant ecological areas and endangered or rare species in the lake areas (Lakes Skinner and Hemet), the valley areas (San Jacinto Valley) and the mountain areas (San Jacinto, Santa Rosa) that could be threatened by development or increased use of popular recreation sites in these areas.

The eastern half of the county, encompassing the Coachella Valley and eastern desert areas, is likewise projected to undergo very significant growth relative to what exists today, adding about 309,000 people for a 175% growth rate. Fragile sand dune habitats and other ecological areas exist in the Coachella Valley, as well as several rare or endangered species (Coachella Fringe-Toed Lizard, rare Magic Geko, Peninsular Bighorn Sheep, Desert Slender Salamander and Desert Pupfish). Protection of many habitats and species in the eastern desert area will depend heavily on the National Forest Service and administration of the California Desert Conservation Plan by the U.S. Bureau of Land Management.

San Bernardino County -- Overall, this county would more than double its population by 2010, from 1.0 million people to 2.3 million people. Nearly half of all of this growth (619,000) would be concentrated in the relatively small Chino Basin subregion in the southwest corner of the county. The East San Bernardino Valley, immediately east, would grow by about 326,000 population. Both of these subregions are extensively urbanized, but additional growth would likely result in continued loss of remaining chaparral, oak woodland, grassland and riparian habitat, especially in the Chino Hills and foothills of the San Gabriel and San Bernardino Mountains.

The Angeles/San Bernardino Mountains transecting portions of both Los Angeles and San Bernardino Counties are another area of concern. The population growth projected for this area is relatively large (51,000) and would more than double existing population. Natural habitats remaining in abundance in these areas would probably be affected by the growth, as well as by increased recreational use from people residing in neighboring counties.

Aside from the areas described above, the vast remainder of San Bernardino County is largely desert and contains important desert habitats and species. The population growth expected in the desert area is small

relative to the land area (297,000 population/12 million acres) but is nonetheless of concern because of the fragility of many of the desert habitats. Expected increases in recreational use would compound the problem. Of particular concern in the south half of the desert are several rare or endangered species (Least Bell's Vireo in the Morongo Valley, the San Bernardino Bird's Beak, an endangered plant found in Lucerne Valley and the rare Mojave Ground Squirrel in the southwestern area), ecologically significant areas, and desert scrub and riparian habitats. The northern Mojave Desert also contains many important ecological areas, and the Colorado River area bordering the eastern side of this county, as well as Riverside and Imperial Counties, contains many rare or endangered bird and fish species.

Imperial County -- Growth of about 64,000 population is projected for this county by 2010 which would still keep it the least populated county of the region (166,000). A variety of significant desert habitats could be degraded or lost, depending on the location of new development, but primarily the amount of increased recreational activity. This County already has very significant recreational use from residents throughout the region. Seven rare or endangered species found along the Colorado River could be adversely affected. In the Salton Sea area, populations of the rare or endangered California Black Rail, Yuma Clapper Rail and Desert Pupfish could be threatened, as could the rare Magic Geko in southwest Imperial County. Uncontrolled recreational activity at the Algodones Dunes, east of Salton Sea, would threaten several endangered plant species.

Marine Ecological Resources

The biological populations of the marine environment off the Southern California coast are diverse, reflecting a variety of ecological niches, and consist of aquatic plants, plankton, invertebrates, pelagic fish and marine mammals. Yet there is no doubt that alterations have occurred to the marine ecology from the many activities of man over a longer period of time. Despite extensive scientific research, however, it is still not fully known what effects the various activities and pollutant discharges have had on the marine ecology.

Major impacts on marine biota that are of concern are: the decrease in abundance and diversity of organisms, alteration of biotic communities, shoreline habitat degradation of bays and estuaries, and the bioaccumulation of toxic substances in sediments and the marine food chain (which in turn poses public health concerns). The main pollutants discharged to coastal waters include those from "point sources" (wastewater treatment plants, storm drains, power plants, refineries) and from "nonpoint sources" (urban runoff and aerial fallout). Other activities also affecting the marine environment include harbor dredging, offshore oil and gas operations, discharges from ship traffic, coastal recreational activities (boating, sport fishing, etc.) and construction/development along the coastline.

The fate of the region's marine environment rests largely with the strict enforcement of existing regulatory controls placed on the various sources

of pollution (which will increase in amount along with growth), as well as the implementation of more stringent controls where it is found that currently allowable pollutant levels are harmful to the marine water quality and biota.

The challenge of protecting the marine environment will undoubtedly be made more difficult by the additional population and economic growth projected in the coastal counties of the SCAG region (Ventura, Los Angeles and Orange). The population is projected to grow by over 30%, or 3.3 million people in these counties over the next 25 years. Looked at from another perspective, the three coastal counties are projected (Baseline Projection) to receive 55% of the region's total growth. The remaining 45% of the region's growth will occur in the inland counties, and some of the increased pollution generated in these rapidly growing counties will ultimately and likely affect the marine environment as well. In particular, Orange County receives runoff from the upstream Riverside and San Bernardino Counties via the Santa Ana River, and a brine line brings effluent down to Orange County from these counties as well.

SEISMICITY

There is no doubt that the SCAG region is an earthquake-prone area, and as its population and development grows and expands, so does its vulnerability to destructive earthquakes. The 1971 San Fernando earthquake, a moderate-sized event (magnitude 6.6) whose epicenter was on the margin of the Los Angeles metropolitan area dramatically showed how vulnerable we are to the damaging effects of earthquakes. That quake caused about \$500 million in damage, killed 58 people, destroyed 800 homes and apartment buildings, and made nearly 1200 structures unsafe for occupancy (Los Angeles Times, July 6, 1986). Had the epicenter of that earthquake been closer in, far more damage to life and property would have occurred, perhaps even more damage than a much larger-sized earthquake located a long distance away from the highly urbanized areas. Very recently (July, 1986) the region has been experiencing renewed seismic activity via a series of small temblors along different faults. These events have again awakened in many people the fear of what would happen if a large earthquake occurs.

Although a damaging earthquake is a relatively rare event, should one occur, the likelihood of truly catastrophic loss of life and property is increasing as development proceeds. The Baseline Projection, which involves very large amounts of growth to the region, makes the situation even more critical. There have already been many earthquakes in the region over the historical period, both major and minor, but most preceded major development in Southern California, and the damaging effects were minor then compared to what could occur today with much more intensive development. Additionally, none of the historical earthquakes have been as strong as the largest magnitude possible in the region, which has been predicted by geologists to be 8.4 magnitude on the San Andreas fault. The strongest earthquake to hit the region in recorded history was the Ft. Tejon temblor of 1857, estimated to be 7.9 magnitude (Evaluating Earthquake Hazards in the Los Angeles Region, U.S.G.S., 1985).

There are literally nearly 100 "active" fault strands in the region, "active" defined as faults considered likely to undergo renewed movement within a period of concern to humans. Faults that currently are slipping, that display earthquake activity, or that have had historical surface rupture clearly are active. There are approximately eleven major fault systems or zones in the SCAG region, as listed below; essentially all urbanized areas of the region lie within range of one or more damaging earthquakes on these eleven fault systems.

1. San Andreas fault zone (the largest active fault)
2. San Jacinto fault zone
3. Elsinore fault zone and related faults
4. Newport-Inglewood fault zone
5. Palos Verdes Hills fault
6. San Pedro Basin fault zone
7. Faults of the Santa Cruz-Catalina seafloor escarpment
8. Faults of the Mojave Desert
9. Faults along margins of San Bernardino Mountains

10. Faults of the southern margin of Western Transverse Ranges
11. Faults within Western Transverse Ranges.

Seismology is a rapidly maturing science, but it is still very difficult to accurately predict which faults in the SCAG region will produce an earthquake, much less when, at what specific locations, and at what magnitudes. Nonetheless, an assessment of earthquake hazards in California (Federal Emergency Management Agency, 1980) concludes that catastrophic earthquakes are inevitable in the Los Angeles region.

Much of the study to date has been done on the big San Andreas Fault. It has been predicted there is a 40% or greater probability that a large earthquake (magnitude 8.3) will occur there sometime in the next 30 years (Evaluating Earthquake Hazards in the Los Angeles Region). A hypothetical earthquake of 8.3 magnitude was modeled along the southcentral portion of this fault by the California Division of Mines and Geology. The research estimated death of 3,000-12,500 persons, hospitalized injuries of 12,800-50,000 (the ranges reflecting different times of day), 52,000 long-term homeless, and building damage totaling \$25 billion (1980 dollars) in Los Angeles and Orange counties alone. Included in these losses could be damage to "lifeline" facilities used for transportation, communications, water supply and other utilities, structures whose failure would be catastrophic (i.e., dams or structures with radioactive or toxic materials), high occupancy buildings, and emergency facilities. The Division of Mines and Geology report includes maps of the region showing where ground rupture, groundshaking and liquefaction (ground failure) would be worse, as well lifeline facilities that would be most affected. Many areas of Ventura County, San Fernando Valley, North Los Angeles County, the South Bay, Coastal Orange County, and urbanized Riverside and San Bernardino counties would experience very strong shock and damage from this hypothetical earthquake. The report heavily cautions that another earthquake on a different portion of the fault, or on another fault for that matter, would produce different damage to different areas of the region.

A similar study was undertaken for a hypothetical 6.5 magnitude earthquake along the northern Newport-Inglewood fault which runs northwest through Los Angeles County from the South Bay up to the Santa Monica Mountains. (Evaluating Earthquake Hazards in the Los Angeles Region, U.S.G.S., 1985.) (The magnitude of this event would be the similar in size to the 1971 San Fernando earthquake). The study concluded that (1) ground rupture of about 8 miles would occur in the Baldwin, Rosecrans and Dominguez Hills; (2) intense shaking and related damage would occur in alluvial parts of the Los Angeles Basin and San Fernando Valley; (3) very intense shaking and related damage would occur in southern San Fernando Valley, Marina del Rey and Long Beach areas; and (4) liquefaction-related ground failure would occur at many beaches, Marina del Rey, the Los Angeles and Long Beach harbor areas, and parts of the Los Angeles and San Gabriel River flood plains. Also, upland areas within 20 miles of the fault would experience landsliding.

As stressed earlier, the entire region is earthquake-prone and any number of faults (in addition to the San Andreas and Newport-Inglewood) located throughout the region could generate earthquakes. In effect, every area of

the region is vulnerable to earthquake hazards (and damage to the extent development exists), particularly groundshaking which generally extends over large geographic areas, and affects areas long distances from actual earthquake epicenters.

Nonetheless, some generalized areas of the region have been judged to have greater susceptibility to earthquake hazards, depending on the location and intensity of actual seismic events. The four major types of earthquake hazards are: (1) surface rupture, (2) groundshaking, (3) liquefaction, and (4) landsliding. These areas are listed on the following table. (Note that part of this list is derived from a relatively old document (SCAG-78 Growth Forecast Policy EIR, 1978. Many recent studies on earthquakes by the U.S. Geological Survey, the California Division of Mines and Geology, research institutions and local governments would need to be reviewed in order to update this list).

Definitionally, surface rupture is a break in the earth that generally occurs in very localized areas along fault traces. As noted above, groundshaking typically extends over very large areas and the actual shaking can be very damaging to life and property because it propagates over such long distances. Liquefaction typically occurs in alluvial areas with loose granular soils and/or high groundwater tables; it involves a process where water-saturated sediment temporarily loses strength and behaves like a liquid, usually because of shaking; it can lead to ground failure, and sinking of surface structures. Landsliding is also triggered by groundshaking and occurs in weak hilly or mountainous areas.

In addition to listing susceptible areas, the table shows which RSA the areas are in, the current population of the RSAs, and the 2010 population of the RSAs based on the Baseline Projection. The table, in essence, gives a general idea of additional residential population going into RSAs with potentially high seismic hazards. Because the risk areas are usually only small portions of the RSAs, it cannot be discerned how much existing or future population exists in the actual hazard areas. Nonetheless, as seen in the table, significant population growth would occur in many RSAs with high seismic hazards. It should be noted that employment also would increase in most of these RSAs.

Regulation of development in these areas is one way to reduce the risk associated with new development. Much of this regulation is beginning to be implemented in the region, and includes measures such as designing and constructing new buildings and facilities to withstand earthquake damage, strengthening or removing unsafe buildings (most of which are older buildings built before 1933), strengthening bridges, regulating the location, density and arrangement of land uses, and in very critical areas such as fault rupture zones, actually prohibiting development. The latter approach has been implemented through the Alquist-Priolo Special Studies Zone Act of 1972 which bans structures for human occupancy within 50 feet of active faults and requires special engineering for critical structures (i.e., dams, pipelines, etc.), that cannot be selectively resited away from

the faults. The development of workable earthquake preparedness programs and response systems is also crucial for the inevitable occurrence of earthquakes in the region.

In conclusion, it must be remembered that every area of the region carries some risk of being affected by seismic activity, and all future development needs to be planned accordingly.

Table 17-1

BASELINE GROWTH (1984-2010) TO RSAS WITH POTENTIALLY HIGH SEISMIC HAZARDS

Seismic Risk Factor*	Location**	RSA	1984 RSA	2010 RSA	1984-2010 Growth
			Population	Population	
Rupture & Shaking	San Gabriel Foothills	28	401,000	1,020,000	619,000
	San Jacinto Valley	48	73,000	254,000	181,000
	Coastal Orange County	38	332,000	396,000	64,000
		39	181,000	259,000	78,000
		40	153,000	346,000	193,000
	Redondo-Hermosa Beach	18	529,000	580,000	51,000
	San Bernardino- Riverside	29	379,000	706,000	327,000
		46	322,000	741,000	419,000
	Lower Santa Clara River	2	143,000	215,000	72,000
		3	213,000	345,000	132,000
	Oxnard Plain	3	213,000	345,000	132,000
	Wildomar	49	34,000	160,000	126,000
	Salton Trough Area	54	19,000	28,000	9,000
		55	102,000	166,000	64,000
	Antelope Valley	9	73,000	182,000	109,000
		10	46,000	163,000	117,000
Liquefaction	Ventura	2	143,000	230,000	87,000
	Oxnard Plain/Cal- leguas Creek Area	3	213,000	345,000	132,000
	Santa Clarita Valley	8	89,000	269,000	180,000
	Reseda-Canoga Park	12	603,000	716,000	113,000
	Sylmar-San Fernando	14	299,000	384,000	85,000
	Ballona Creek/Marina del Rey	18	529,000	580,000	51,000
	L.A./Long Beach Harbors	20	437,000	502,000	67,000
	Bell	21	949,000	865,000	(-84,000)
	Whittier Narrows	22	639,000	708,000	69,000
	La Palma/Los Alamitos	35	159,000	162,000	3,000
	Coastal Orange County	38	332,000	396,000	64,000
		39	181,000	259,000	78,000
	Santa Ana	42	401,000	462,000	61,000
	Riverside Area	46	322,000	741,000	419,000
	Colton-San Bernardino	29	379,000	706,000	327,000
Landslides	Santa Monica Mtns.	5	112,000	265,000	153,000
		7	42,000	82,000	40,000
		15	16,000	25,000	9,000
		16	320,000	375,000	55,000
		17	1,026,000	1,146,000	120,000

Santa Susana Mountains	12	603,000	716,000	113,000
	14	299,000	384,000	85,000
Puente Hills	22	639,000	708,000	69,000
	26	551,000	873,000	322,000
Palos Verdes Hills	19	448,000	573,000	125,000
N. Santa Ana Mtns.	41	129,000	262,000	133,000
Oak Ridge	4	97,000	170,000	73,000
	6	14,000	18,000	4,000
Sulfur Mtn.	2	143,000	215,000	72,000
Fillmore Area	6	14,000	18,000	4,000
E. Mesa Area	55	134,000	166,000	32,000
San Joaquin Hills	40	153,000	346,000	193,000
San Gabriel Foothills	24	467,000	518,000	51,000
	25	735,000	934,000	199,000
	26	551,000	873,000	322,000
	27	188,000	286,000	98,000
	28	401,000	1,020,000	619,000
San Gabriel Mountains	11	2,400	2,300	(-100)
Downtown Los Angeles	4	97,000	170,000	73,000
Simi Valley	23	127,000	127,000	0
Camarillo Hills	3	213,000	345,000	132,000
Thousand Oaks	5	112,000	265,000	153,000

Sources for Seismic Hazard Areas: For Rupture/Shaking and Landslide/Erosion areas: SCAG-78 EIR. For Liquefaction areas, Evaluating Earthquake Hazards in the Los Angeles Region, U.S.G.S., 1985, and Los Angeles Co. General Plan EIR, 1981.

* Note that rupture, liquefaction, and landslides usually occur in localized areas, whereas groundshaking is generally areawide.

** The locations identified in the table are usually only portions of RSAs; the growth amounts apply to the entire RSAs.

OPEN SPACE

This section examines the potential loss of open space that could result from growth and urbanization in the Baseline Projection. The section following this one addresses agricultural lands which are an important subcategory of open space.

Open space is defined here very broadly to include all nonurban land in the SCAG region, i.e., land not devoted to the following uses: residential, commercial, industrial, transportation/utilities/communications, and public/institutional (i.e., hospital, schools). It ranges from large undeveloped expanses of land to individual vacant parcels interspersed among urban uses.

Open space lands provide many important values to the region, including:

- Outdoor recreation
- Scenic qualities and visual relief from urbanization and crowding
- Preservation of natural resources (i.e., ecological areas, water bodies, beaches, airsheds, mountains, and deserts)
- Managed production of resources (i.e., crops, rangeland, mineral production, timber production, groundwater recharge)
- Preservation of health and safety (i.e., hazardous areas such as steep slopes, landslide areas, fire areas, and seismic faults)
- Urban buffering and shaping.

Existing Open Space in SCAG Region

As part of the development of the SCAG-82 Growth Forecast Policy in 1982, SCAG compiled an inventory of urbanized and nonurbanized acreage throughout the 23 various subregions of the SCAG area, working with the counties. This inventory was subsequently updated to reflect acreage as of 1984. Nonurbanized acreage, or open space land, was placed into two classifications, as defined below:

- (1) Vacant developable land -- vacant lands physically capable of being developed for urban uses, having less than 15% slope and being free of special hazards. Inclusive of all agricultural lands.
- (2) Vacant land unsuitable for development -- vacant lands with steep slopes or hazards; lands committed to long-term uses (i.e., parkland, golf courses, national forests, beaches, military lands, BLM public lands); and surface water.

Figure 18-1 shows the 23 subregions, and the classification of each subregion as either highly urbanized (more than one half of the acreage is urban; less than one half is nonurban (open space)), urbanizing (less than one half of the acreage is urban; more than one half is nonurban (open space)), and mountain/desert (predominantly rural).

Table 18-1 identifies for each subregion, and each category of subregion (i.e., highly urbanized, urbanizing, mountain/desert) its total land acreage, and the percent of land devoted to urban uses vs. open space uses as of 1984.

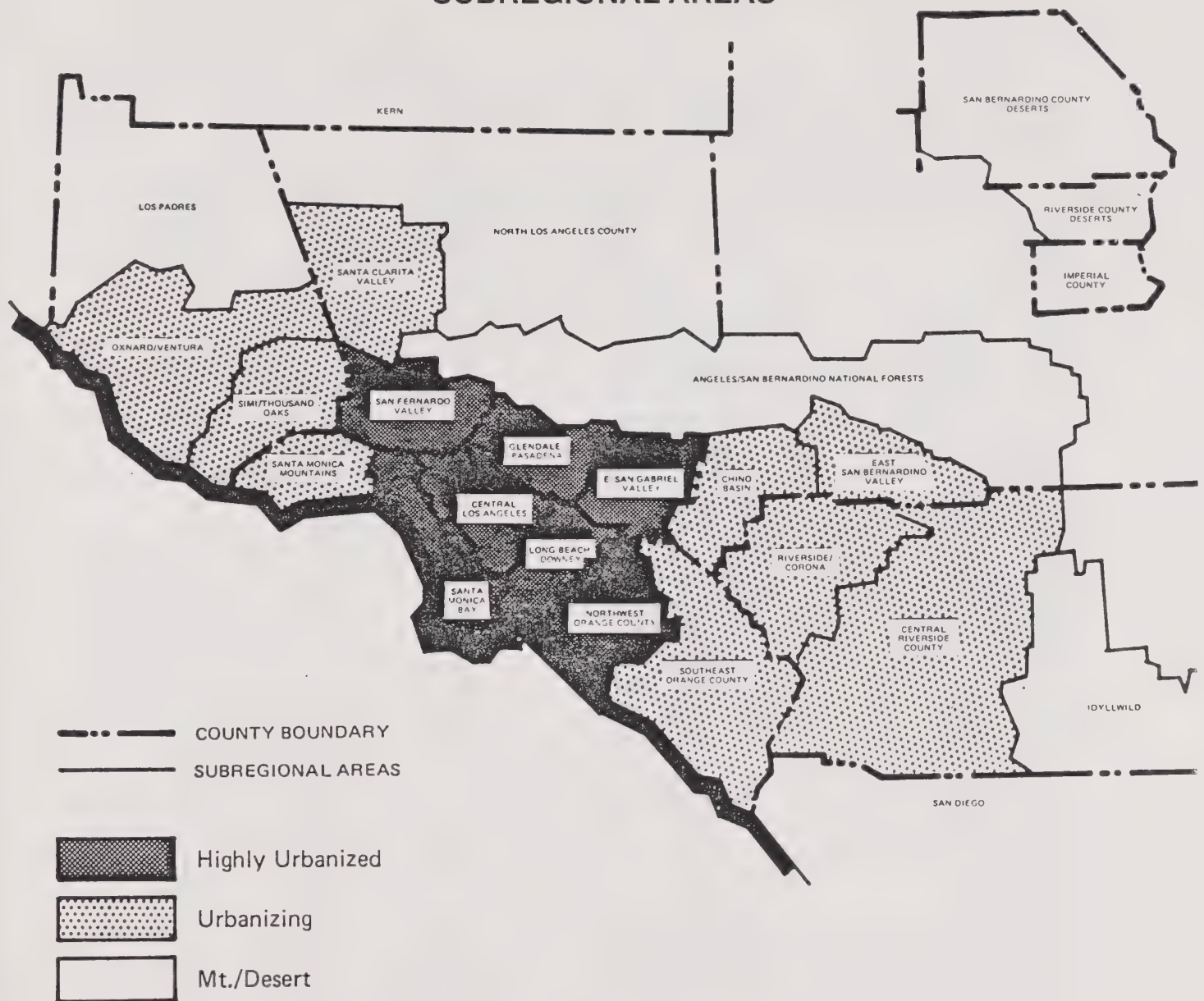
Some very important findings about existing open space may be derived from the table:

1. Only 5% of the entire region is actually urbanized, and 95% of the region is either vacant developable land, or vacant land, unsuitable for development.

However, nearly 90% of the open space acreage is in the more remote outlying mountain and desert subregions of the SCAG area. Ten percent of all remaining open space is in the closer-in urbanizing areas of south Ventura County, the Santa Clarita Valley, Southwest Los Angeles County, Southeast Orange County, and western Riverside and San Bernardino Counties. Less than 1% of the region's open space acreage exists in the highly urbanized subregions that are located within the coastal plains and valleys of Los Angeles and northwest Orange counties.

2. The mountain/desert subregions, consisting of 85% of the region's total land area, have the smallest amount of population (5% of the region's population), and as mentioned above, nearly 90% of all remaining open space in the region. Nearly 99% of the vast land acreage in these subregions is presently open space (21 million acres), and approximately 20% of that land is considered suitable for development (the remainder being unsuitable for development due to existence of steep slopes, special hazards, or commitment to long-term uses).
3. Approximately 20% of the region's population currently lives in the urbanizing subregions where 10% of all open space land remains (2.3 million acres). About 85% of the land acreage in these subregions is still open space, and 40% of this land is considered suitable for development. The urbanizing subregions comprise about 10% of the region's total land area.
4. The highly urbanized subregions contain the bulk (75%) of the region's population, but have less than 1% (198,000 acres) of the region's total open space. About 20% of the total land acreage in these subregions is open space, and about 50% of the open space land is judged suitable for development. The highly urbanized subregions comprise only about 5% of the region's total land area.

FIGURE 18-1
SUBREGIONAL AREAS



VOCABULARY OF SCALE

- SCAG Region:** Consists of six counties (Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura).
- Subregions:**
- Highly Urbanized -- more than one-half of land area urbanized in 1980; composed of 7 subareas.
 - Urbanizing -- less than one-half of land area urbanized in 1980; composed of 9 subareas.
 - Mountain/Desert -- predominantly rural in 1980; composed of 7 subareas.

Table 18-1

INVENTORY OF OPEN SPACE LAND
1984 and 2010 (Baseline Projection)

Subregions	Total Land	1984		2010	
		% Urban Land ¹	Nonurban (Open Space) Land ²	% Urban Land	Nonurban (Open Space) Land ²
HIGHLY URBANIZED	932,000	79	21	87	13
S.F. Valley	169,900	68	32	76	24
Glen./Pasadena	133,500	74	26	79	21
E. San Gab. Valley	139,700	59	41	78	22
S. Monica Bay	147,500	73	27	82	18
Central L.A.	127,100	91	9	93	7
L. Beach/Downey	106,800	87	13	91	9
N.W. Orange Co.	150,900	81	19	90	10
URBANIZING	2,656,500	15	85	30	70
Oxnard/Ventura	453,800	10	90	17	83
Simi/Thou. Oaks	183,700	16	84	30	70
S. Clarita Val.	239,000	8	92	15	85
S. Monica Mtns.	104,100	13	87	19	81
Chino Basin	152,300	38	62	79	21
Riverside/Corona	269,000	20	80	41	59
E. S.B. Valley	154,900	34	66	62	38
Central Riv. Co.	750,100	8	92	16	84
S.E. Orange Co.	349,600	21	79	47	53
MTN/DESERT	20,938,400	0.8	99	2.0	98
Los Padres	568,300	0.1	100	0.1	100
N. L.A. County	1,049,300	4.0	96	7.7	92
Angeles/S.B. Forest	870,400	2.0	98	5.0	95
S.B. Deserts	12,037,900	0.3	100	0.4	99
Riverside Deserts	3,156,900	1.0	99	2.8	97
Idyllwild	516,100	0.2	100	0.5	99
Imperial Co.	2,739,200	0.6	99	1.0	99

1. Land devoted to residential, commercial, industrial, transportation/communication/utilities and public/institutional (excludes parkland) uses.
2. Includes (a) vacant land suitable for development (land having less than 15% slope and free of special hazards) as well as agricultural lands; and (b) vacant land unsuitable for development (steep slopes or special hazards or land in permanent reserve).

Sources: SCAG, SCAG-82 Growth Forecast Policy, 1982; SCAG Working Paper: Land Converted to Urban Uses 1979-1984, March 1986; Baseline Projection Estimate of Added Urban Acres, October 1986.

Existing Open Space Problems

Since less than 5% of the region is urbanized and over 95% remains open, the gross numbers make it appear that there is a great supply of open space land and no deficiency exists. Yet, most people agree that the open space shortage is very great based upon considerations of the actual location of the open lands. Open space issues are most often population-oriented. A great deal of the existing open space is located in the hills and mountains, and huge acreage exists in the deserts. It is in the urbanized areas that the perceived deficiencies occur. As stated above, 75% of the entire region's population resides in highly urbanized areas where nearly 80% of the land is urbanized and 20% is open space. This open space land, representing only 1% of all open space land through the region, and totaling about 198,000 acres is a size that is a little larger than the San Fernando Valley. Within certain highly urbanized subregions, the proportion of land that is open space is very low -- for example, 9% in the central Los Angeles subregion, and 13% in the Long Beach/Downey subregion.

The value of open space within the urban environment is that it directly provides relief to urban dwellers seeking closeby tranquil or scenic areas, or desiring areas for nearby active recreational experiences. These needs may be met not only in parks, beaches, and recreational areas, but also in greenbelt areas, and small open areas interspersed among intensive urban uses. Additionally, greenbelt areas, through shaping and buffering, aid in distinguishing one city from another, and help maintain community identities. The deficiency of open space in highly urbanized areas has had negative results: First, existing open space in these areas is often overutilized by the public, and in some cases outright destruction of open space areas has occurred, further reducing the very open space values most people are seeking. Second, lack of open space within the urbanized areas has forced many individuals to seek open space experiences long distances from where they live.

Remaining open space acreage in the highly urbanized areas is probably the most important open space to maintain in the region, from the standpoint of its relative scarcity, and its serving the greatest concentration of population in this region. Yet, as seen in the upcoming section, continued urbanization is expected in the highly urbanized areas, which will result in further loss of relatively scarce open space in these areas.

While the highly urbanized subregions have already lost much of their original open space to development, the urbanizing areas as a whole have 85% of their land area still in open space. However, significant growth that is now occurring in the urbanizing subregions surrounding the highly urbanized areas is resulting in further loss of open space in these areas. The steady outward movement of urban development has placed development pressure on some of the most desirable parcels of open space adjacent to, and usable by the highly urbanized areas. The population growth that occurred in urbanizing subregions during the 1970-1980 decade gives some indication of the scale of open space converted to urban uses; during that decade the urbanizing subregions grew by 50%, or 813,000 people. In comparison, highly urbanized subregions grew by 7%, or 572,000 people. The

density of new development in urbanizing areas has tended to be lower than in the highly urbanized areas, resulting in proportionately more open space being consumed in urbanizing areas.

Future Loss of Open Space

The Baseline Projection would result in the conversion of an estimated 647,000 acres of nonurban (open space) land to urban uses by 2010. This would represent a 50% increase in urbanized land in the region, but only a 3% regionwide decrease in the amount of open space.

Even though the loss of open space at the regional scale is very small, the loss will be very large in certain areas of the region. In particular, the highly urbanized subregions collectively will undergo nearly a 40% decrease in the amount of open space existing in those subregions (80,000 acres), making the amount of open space drop from 21% of their total land area to 13% of their total land area (Table 19-1). This will be needed to accommodate the 1.6 million person growth in these subregions. The three highly urbanized subregions that will undergo the greatest open space losses are the East San Gabriel Valley, San Fernando Valley and Northwest Orange County subregions.

Although over twice as much population will be added to the urbanizing subregions (3.4 million people), nearly four times as much open space (396,000 acres) will be lost to urbanization due to the predicted lower density development that will occur in these subregions. Because there is relatively much more open space in these subregions, this loss will represent only an overall 18% decrease in open space, making the proportion of open space to total land area drop from 85% to 70%. The four subregions that will undergo the greatest percentage decreases in open space will be the Chino Basin, East San Bernardino Valley, Southeast Orange County and Riverside/Corona subregions. In fact, urbanization will be so great in two of these subregions that the amount of urbanized land will exceed 50% by 2010, making them by definition, "highly urbanized" instead of "urbanizing." Chino Basin will be 79% urbanized, and East San Bernardino Valley will be 62% urbanized. Southeast Orange County will come close to being highly urbanized at 47%.

The rather significant growth also predicted for the mountain/desert subregions (956,000 people) will result in the loss of 171,000 acres of open space to urban uses. However, the amount of open space in these subregions is so vast (90% of all open space in the region), that this will only represent less than a 1% loss in open space in these areas.

AGRICULTURE

With the extensive growth entailed in the Baseline Projection, a key issue is the potential impact of this growth on agricultural lands. Despite intensive urbanization over the past 30 to 40 years and the loss of agriculture lands to development, the SCAG region still remains a major agricultural area; all of the region's counties are included in the list of California's leading 18 counties in value of production. Total production in the region reached \$1.4 billion in 1981 (1971 dollars) and each county had a real increase in the value of production between 1970 and 1980. The two leading agricultural areas are Riverside and Imperial counties; in 1981 these two counties generated over 50% of the total value of production in the region, as shown in the table¹² below. Next in production value were San Bernardino and Ventura counties.

TOTAL 1981 AGRICULTURAL PRODUCTION BY COUNTY
(MILLIONS OF 1971 DOLLARS)

<u>County</u>	<u>\$ Value</u>	<u>% of Regional Total</u>
Riverside	347.4	25.1
Imperial	338.9	24.5
San Bernardino	245.2	17.7
Ventura	221.6	16.2
Los Angeles	120.1	8.7
Orange	108.3	7.8
Total	\$1,381.5	100.0%

Even though agriculture remains an important industry in the region, past and continuing urbanization continues to convert prime agricultural land every year into subdivisions and other uses. This conversion occurs despite preservation programs, such as the Williamson Act and local government land use programs, which do not protect all prime agricultural lands. The Williamson Act is often thought of as placing agricultural lands in permanent preserves; in actuality, it commits farmers to keeping their land in cultivation for ten years, based on the incentive of lower property taxes. The State Department of Water Resources has estimated that every year between 1972 and 1980, 44,000 acres of cropland were converted statewide to urban and suburban development. (California Lawyer, August 1986). The most desirable and vulnerable lands are agricultural lands located in urbanizing areas adjacent to metropolitan areas where development is spreading. Basic economic principles indicate that land used for suburban development is worth up to at least 10 times more than land used for agriculture.

12. SCAG, The Importance of Goods Movement and Regional Transportation to the So. California Economy and International Trade, 1983.

Urbanization affects the agricultural industry in two ways. First, most development takes place on prime agriculture land, because this land is fairly flat and well-drained, and provides the easiest and most suitable building types. Second, as prime lands become urbanized, some agriculture gets replaced on lands that are not be as suitable (e.g., hillside areas), or as fertile and productive as the original fields. The net effect is that the amount of vacant land that can be converted to viable cropland is quickly dwindling.

Effects of Baseline Projection Growth on Agriculture

It is not possible to project the amount of agricultural land acreage that would be converted to urban uses under the Baseline Projection, mainly because the projection is not at a small enough geographic scale and it does not include a land use projection.

However, the following table does identify subregions within the six counties that contain the most extensive agricultural acreage, and their acreage amounts. It also shows existing vacant developable land acreages within those subregions (inclusive of agriculture), and finally, the amount of vacant developable land that is estimated to be converted to urban uses by 2010 under the Baseline Projection. Subregions undergoing intensive urbanization as well as containing significant agriculture acreage can be expected to lose some of this acreage.

From examining the table, it appears certain that an unknown quantity of agricultural lands would be lost in the East San Gabriel Valley, scattered areas of Orange County and the Coachella Valley. It also appears likely that agriculture would be lost in western Riverside County, western San Bernardino County, the Santa Clarita Valley, north Los Angeles County, and the southern part of Ventura County. The Imperial Valley appears to be least in jeopardy of agricultural loss; the land acreage is very extensive in this area and relatively little urbanization is predicted to occur.

Table 19-1

SUBREGIONS WITH IMPORTANT REMAINING AGRICULTURE LANDS
AND AMOUNT OF ALL VACANT LAND CONVERTED TO URBAN USES BY 2010

Subregion	Location of Agriculture	Current Agricultural Acreage ¹	1984 Vacant Developable ² Land Acreage (Includes Agriculture)	Estimated Vacant Developable Land Converted to Urban Uses by 2010
<u>Ventura County</u> Oxnard/Ventura & Simi/Thousand Oaks	Ojai Valley, Santa Clara Valley, Oxnard Plain, Santa Rosa and Las Posas Valleys	123,100	224,824	55,262
<u>Los Angeles County</u> N. L.A. County	Antelope Valley	66,000	N/A	35,790
E. San Gabriel Valley	Claremont/La Verne/ Walnut	8,800	28,847	25,962
Santa Clarita Valley		8,000	N/A	20,437
<u>Orange County</u> Northwest & South- east Orange County	Santa Ana, Tustin, Rancho Mission Viejo, Capistrano, Los Alamitos, and Seal Beach Areas; Southeast area of county	44,460	164,174	102,102
<u>Riverside County</u> Riverside/Corona & Central Riverside Co.	Norco, Moreno Valley, San Jacinto Valley, Perris Valley, Hemet Area, Anza Area	216,036	410,739	120,567

Table 19-1 (Continued)

Riverside Co. Deserts	Palo Verde Valley (101,337 acres)			
	Coachella Valley (68,287 acres)			
	TOTAL	169,624	231,864	51,180
<u>San Bernardino County</u>				
Chino Basin & E. S.B. Valley		55,845	N/A	104,824
San Bernardino Deserts		30,000	2,477,189	50,996
<u>Imperial County</u>				
Imperial Co.	Imperial Valley (450,000 acres)			
	Yuma Area (15,000 acres)			
	TOTAL	465,000	1,064,716	10,015
GRAND TOTAL		1,186,865	4,602,353	577,135

1. Includes irrigated cropland, dry cropland, and dairies/feedlots; does not include grazing acreage except in Riverside County.
2. Includes agricultural acreage listed in column to left.

Source: Agricultural acreage figures from U.S. Soil Conservation Districts in SCAG region, with exception of Los Angeles Co.; data is from LA Co. General Plan, 1981.

STAFF CREDITS

SCAG MANAGEMENT:

Mark Pisano, Executive Director
Frank E. Hotchkiss, Director, Regional Strategic Planning Department
Gloria S. McGregor, Director, Environmental Planning Department
Jim Gosnell, Director, Transportation Planning Department

PROJECT STAFF:

Project Manager:

Joanne Freilich, Principal, Environmental Analysis

Contributing Authors:

Judith Hamerslough, Transportation Planner
Diane Collins, Transportation Planner
Gill Hicks, Principal, Ports Planning
Fred Kahane, Senior Housing Planner
Jay Kaplan-Wildmann, Air Quality Planner
Tim Merwin, Principal, Aviation Planning
Roger Riga, Principal, Regional Transportation Plan
Marianne Yamaguchi, Environmental Planner
Julie Cook, Intern
Pia Wong, Intern

DATA MANAGEMENT ASSISTANCE:

W. O. Ackermann, Director, Data and Support Services Department
Hong Kim, Principal, Transportation Modeling
Teresa Wang, Senior Transportation Systems Analyst

SUPPORT ASSISTANCE:

Annette Escobedo, Word Processor
Susanna Berzsenyi, Manager, General Services
Welma Fu, Graphics Designer

The preparation of this report was financed in part through grants from the U.S. Department of Transportation Urban Mass Transportation Administration under the Urban Mass Transportation Act of 1964, as amended; from the U.S. Department of Transportation Federal Highway Administration under the Federal Aid Highway Act of 1973, as amended; and from the State of California.

U.C. BERKELEY LIBRARIES



C124896981

